
RTMENT
PUBLIC HEALTH
CITY OF NEWARK

ANNUAL REPORT

DEPARTMENT OF PUBLIC HEALTH

CITY OF NEWARK, N. J.

1899

Board of Health

Dr. H. C. H. HEROLD, President,	75 Congress Street
Mr. M. STRAUS,	1085 Broad Street
Mr. A. H. JOHNSON,	1000 Broad Street
Mr. J. A. FURMAN,	65 South Tenth Street
Mr. MATTHEW T. GAY,	47 Lincoln Avenue
Dr. C. M. ZEH,	481 Broad Street
Dr. D. L. WALLACE,	202 Clinton Avenue
Dr. F. W. BECKER,	478 Clinton Avenue
Dr. W. S. DISBROW,	151 Orchard Street
Mr. HUGH SMITH,	36 Central Avenue

HEALTH OFFICER

Mr. DAVID D. CHANDLER,	74 North Seventh Street

Standing Committees of the Board of Health

SANITATION

Dr. Disbrow — Dr. Becker — Dr. Zeh
Mr. Gay — Mr. Johnson

FINANCE

Mr. Straus — Mr. Johnson — Dr. Zeh

CITY HOSPITAL

Dr. Zeh, — Mr. Furman — Mr. Johnson
Dr. Wallace — Mr. Straus

LAWS AND ORDINANCES

Mr. Gay — Mr. Smith — Mr. Furman

RULES

Mr. Smith — Mr. Gay — Dr. Becker

APPOINTMENTS

Mr. Johnson — Mr. Furman — Dr. Wallace

SUPPLIES

Dr. Becker — Mr. Furman — Dr. Disbrow

TRAINING SCHOOL

Dr. Wallace — Dr. Disbrow — Dr. Herold

Employees of the Board of Health

OFFICE DIVISION

John J. Greene, . *Clerk Bureau of Contagious Diseases*
No. 63 Newton Street

Eugene W. Bellar, . . *Clerk Sanitary Division*
No. 45 Congress Street

Marie Perier, . . *Stenographer to Health Officer*
No. 372 High Street

Edward E. Worl, M. D., *Supt. Bureau of Contagious Diseases*
No. 271 High Street.

Herbert B. Baldwin, ... *Chemist*
No. 906 Broad Street

George C. Sonn, ... *Meteorologist*
No. 285 Belleville Ave.

BACTERIOLOGICAL DIVISION

Dr. R. N. Connolly, *Bacteriologist*, . City Hospital
Dr. R. C. Ribbans, *Assistant Bacteriologist*, 15 Warren Street
Ernest L. Skillman, *Porter*, . . . 58 Court Street
Herman Volk, *Culture Collector*, . 108 McWhorter Street

CITY DISPENSARY

William A. Smith, *Apothecary*, . . 1 Sherman Avenue
Henry A. Oltmann, *Assistant Apothecary*, 48 New Street
William M. Gould, *Dentist*, . . 89 Halsey Street

DISTRICT PHYSICIANS

William Schopfer,	43 Read Street
Herbert W. Long,	119 Madison Street
William M. Goodwin,	64 Congress Street
Matthew T. Gaffney,	211 Plane Street
M. Louise Lefort Welzmiller,	300 Washington Street
Samuel H. Baldwin,	473 Clinton Avenue
Vincent Nager,	23 Beacon Street
William Gauch,	294 Orange Street
Charles W. Titus,	126 North Seventh Street
Hugh M. Hart,	274 Broad Street
Fred. Hagney,	67 Pennsylvania Avenue

SANITARY DIVISION—MEAT INSPECTORS

Werner Runge,	130 Union Street
Charles Wolz,	81 Ferry Street

PLUMBING INSPECTORS

John B. Sullivan,	204 Second Street
William H. Grier,	37½ Third Street
Henry W. Schroeder,	187 Bank Street

SANITARY INSPECTORS

Thomas E. Freeman,	42 Crawford Street
Louis H. Bridgem,	59 Court Street
William H. Young,	170 Thirteenth Avenue
Andrew J. Brady,	17 Howard Street
John Wright,	129 Newton Street
Thomas F. Newton,	141 Clifton Avenue
Morris Seidl,	411 South Eighth Street
Forman J. Reynolds,	182 Summit Street
Otto B. Schalk,	407 Bergen Street
Charles E. Burke,	125 Union Street
Bernard Cahill,	311 Warren Street
Herbert O'Rourke,	92 Brunswick Street
Michael Helmstaedter,	335 Mulberry Street
Richard J. Corbley,	45 Providence Street
Antonio Panzera,	66 Madison Street

MILK INSPECTOR

William H. Lyle, ... 63 Newton Street

DISINFECTING CORPS

Samuel Knott, *Chief*, ... 279 Plane Street

John L. Ball, ... 45 Nichols Street

William Parker, ... 233 Academy Street

Hiram R. Stewart, ... 66 Thomas Street

Leonard Gillen, ... 126 Halsey Street

Frank Fetridge, . . *Orderly at Isolation Hospital*
Sherman Avenue and Concord Street

Matilda Hoagland, ... *Janitress*
15 William Street

DISTRICT PHYSICIANS, 1899

1st DISTRICT—Dr. W. SCHOPFER.—District Lines: Polk Street, Lafayette Street, Hamburg Place, Thomas Street and Passaic River.

2d DISTRICT—Dr. H. W. LONG.—District Lines: Polk Street, Lafayette Street, Hamburg Place, Thomas Street, Newark Bay, City Line, Avenue D, Pacific Street, Clifford Street, Jefferson Street and Passaic River.

3d DISTRICT—Dr. W. M. GOODWIN—District Lines: Jefferson Street, Clifford Street, Pacific Street Tichenor Street, Broad Street, Market Street, Railroad Place and Passaic River.

4th DISTRICT—Dr. M. T. GAFFNEY.—District Lines: Railroad Place, Market Street, Lincoln Park, Spruce Street, High Street, Court Street, Washington Street, Market Street, High Street, Central Avenue, Fulton Street and Passaic River.

5th DISTRICT—Dr. M. LOUISE LEFORT WELZMILLER.—District Lines: High Street, Warren Street, Newark Street, Richmond Street, Rankin Street, Charlton Street, Spruce Street, High Street, Court Street, Washington Street and Market Street.

6th DISTRICT—Dr. S. H. BALDWIN.—District Lines: Charlton Street, Springfield Avenue, Fifteenth Avenue, City Line, Lyons Avenue, Clinton Place, Hawthorne Avenue, Ridgewood Avenue, Livingston Street, Eighteenth Avenue and Spruce Street.

7th DISTRICT—Dr. V. NAGER.—District Lines: Fifteenth Avenue, Springfield Avenue, Rankin Street, Richmond Street, Newark Street, Warren Street, Central Avenue and City Line.

8th DISTRICT—Dr. W. GAUCH.—District Lines: High Street, Eighth Avenue, Clifton Avenue, Norfolk Street, Central Avenue, Hudson Street and Warren Street.

9th DISTRICT—Dr. C. W. TITUS.—District Lines: Central Avenue, Warren Street, Hudson Street, Central Avenue, Norfolk Street, Clifton Avenue, Bloomfield Avenue and City Line.

10th DISTRICT—Dr. H. M. HART.—District Lines: Fulton Street, Central Avenue, High Street, Eighth Avenue, Clifton Avenue, Bloomfield Avenue, City Line and Passaic River.

11th DISTRICT—Dr. F. W. HAGNEY.—District Lines: Avenue D, Pacific Street, Tichenor Street, Lincoln Park, Spruce Street, Eighteenth Avenue, Livingston Street, Ridgewood Avenue and City Line.

Antitoxin and Culture Stations

Established by the Board of Health for the Collection of Cultures and Distribution of Antitoxin

D. Bramley,	110 Union Street,	2097A	N. Y. & N. J. Tel. Co.
F. W. Rodemann,	77 Ferry Street,	2009B	"
Grossenbeck & Reichle,	28 Bowery Street,	2080 Bowery	"
Francis Brellier,	Lafayette Street and Hamburg Place,	2091A	"
Linnett Bros.,	77 Lincoln Park,	2045A	"
E R. Petty,	925 Broad Street,	914	"
Petty's	Prudential Building,	914	"
Charles Holzhauer,	Market and Broad Streets,	2012	"
Greenlief,	Central Avenue and Broad Street,	2208	"
Harry F. Jackson,	482 Broad Street,	2236B	"
William Scudder,	95 Belleville Avenue,	2279	"
Albert Schurr,	289 Belleville Avenue,	2206	"
H. Weller,	190 Washington Avenue,	2049F	"
Jacob Betzler,	503 Orange Street,	2097A Roseville	"
Avery & Co.,	291 Central Avenue,	2073A	"
Charles Moll,	166 Central Avenue,	2019	"
David Goldsticker,	55 South Orange Avenue,	717	"
Emil Reichle,	362 Springfield Avenue,	2234	"
C Hitchcock,	315 South Orange Avenue,	2059B	"
R. Staebler,	Broome Street and Springfield Avenue,	2147	"
Board of Health Office,	843 Broad Street,	231	"

ANNUAL REPORT

OF THE

HEALTH OFFICER

FOR THE YEAR 1899

ANNUAL REPORT

OF THE

HEALTH OFFICER

FOR THE YEAR 1899

To the Honorable, the Board of Health of the City of Newark, New Jersey:

GENTLEMEN:—I have the honor to herewith present to you my report of the workings of the various divisions of the Department of Public Health, together with a report of the Superintendent of the Bureau of Contagious Diseases, Bacteriologist and Chemist of the Board, for the year ending December 31st, 1899.

As to the urgent needs of the Department for carrying on its work in an efficient and scientific manner, I would again most respectfully refer you to my report of 1897

VITAL STATISTICS.

The total number of births reported during the year was 6,721. Of this number 6,607 were white and 114 col-

ored, 3,469 were male and 3,203 were female, and the sex of forty nine was not stated; 6,669 were legitimate and 52 were illegitimate.

The birth rate per thousand of the population is 28 00 and exceeds the death rate for the year 9 10.

There were 281 still births, or 1 17 per thousand of the population (See table 1).

MARRIAGES.

There were recorded 2,090 marriages. Of this number 2,027 were white and 63 colored This represents a rate of 8 60 per thousand, which must be considered below the actual rate Neglect on the part of those whose duty it is to report these facts is the cause (See table 11)

DEATHS.

There were reported during the year 4,537 deaths, which represents a death rate of 18 90 per thousand. Of these 3,113 were native born and 1,373 were foreign born, and in 51 cases the nativity was not stated Of this number 4,310 were white; 225 colored and 2 Mongolians.

The social state of decedents was as follows:

Single	2,384
Married	1,353
Widow	452
Widower	260
Not stated	58
Total	4,537

Eight hundred and three deaths occurred in institutions and public places. (See table 4).

PHTHISIS.

Attention has been called in Dr. E E. Worl's report

to the number of deaths from this disease and its prevalence in this city The indications are that the time must come when these cases are to be dealt with by outdoor and Sanitarium treatment, and not in the ordinary wards of our City Hospital This would doubtless relieve the Hospital of many cases tending to become chronic.

TYPHOID FEVER AND WATER SUPPLY.

During the past year a thorough inspection of our watershed, tracing the source of every stream and the location of every possible source of pollution, has been made by this Board This report is on file in this office for reference; and, together with the careful reports of our Bacteriologist and Chemist on samples of water constantly taken, keep us in touch with the purity of water furnished our citizens The importance of this constant supervision of our water supply can be easily shown by reference to the Typhoid Fever Reports, and, particularly, the Special Report on the outbreak in the spring of 1899. No more convincing evidence can be offered that eternal vigilance is the price of our safety.

DISINFECTION.

Disinfection—and by this term we mean the total destruction of infectious material, is too generally misapplied. A foul odor may be a key to the discovery of a heap of filth or may accompany some process of chemical decomposition. The danger in the loose use of this term seems to be, that the agent, which takes away the smell or deodorizes it, may be considered as having also taken away the danger, and this is not necessarily the case The

public in general judges the case by the presence or absence of a bad smell; for example - Dr Sternberg tells us that "Sulphate of Iron does not destroy the vitality of disease germs or the infective power of the material containing them;" and yet it is available for the arrest of putrefactive decomposition Again he says that "Common Salt and Sulphate of Iron have scarcely any Germicide power though used as Antiseptics."

For general and popular use we may recommend the Chloride of Lime, in solution, and made as required It requires a strong solution in close contact with the material and sufficient time to do its work.

In the work of the Board of Health, Formaldehyde Gas has given satisfaction, and the results, as determined by "*test cultures*," show its efficiency.

There is a growing demand for thorough fumigation, and the work of the Disinfecting Corps will, in time, have to be largely increased During the past year the work of this Department has been such as to task its utmost capacity.

TENEMENT DISTRICTS

With our varied population there is a tendency towards the grouping in certain quarters of our city of a large class of tenement houses, and in proportion to the crowding of large numbers on restricted areas, are we to find the prevalence of certain diseases, and a general unsanitary condition, which has to be dealt with, time and time, again We would advocate a Building Law which would strictly define the lines on which such structures shall be built; and further the law should be enforced in

regard to efficient "fire escapes" on such buildings; and if sufficient power does not already exist, it should be granted or extended by Ordinance; the safety of 250,000 people demands it.

MEDICAL INSPECTION OF SCHOOLS.

Advances in the knowledge and spread of Contagious diseases in our city demand a further enlargement and application of methods to combat them.

It has long been noted, that the opening of our Public schools brought about an increase in the number of Contagious diseases reported to this Board, and, particularly, Scarlet Fever and Diphtheria.

The spread of Measles through our schools this last winter, only illustrates the same point. An experimental examination and culture of an ordinary school slate showed the presence of a large number of putrefactive Bacteria.

The crowding together of large numbers of persons can only be tolerated under the most Sanitary conditions. We rightly require not only ordinary standards but a degree above the ordinary. We must have healthy schools and healthy scholars. The Medical Inspection of Schools has been in practical operation in a number of other cities say Boston, Philadelphia and New York, and to it we must sooner or later come We have at hand records of the examination of about 140,000 pupils; of these 7,606 were excluded for various reasons. namely, 3,500 for Parasitic diseases of the head; 1,627 for Contagious Eye diseases; the rest for Infectious and Skin diseases; the

Infected list, therefore, comprehends 5[illegible]% of the examined list.

This is sufficient to show the necessity of supervision and there only remains the methods to be pursued in the attainment of the result It seems desirable for a division of this city into districts, each district containing a certain number of schools under the direction of a Medical Inspector He should examine each child excluded from class, and render a report If it be an Infectious case, it should be immediately reported, he should have prompt knowledge of every Infectious case in his district, and examine it to see if such case is being kept properly isolated, or order removal of said case to Hospital; and in this supervision he should be an adjunct to the regular physician in this regard, and should also make suitable culture of the throat in convalescent Diphtheria, and examine carefully the desquamation of Scarlet Fever cases to see that desquamation is positively completed; no fumigation of premises or removal of cards should be done until such supplemental reports are considered satisfactory.

Again the present system of Vaccination and Certificates is far from perfect It is absurd to depend on the written certificate; the "Vaccination marks" of the body are the best possible certificate, and these evidences are the ones to be most carefully registered and examined. Re-vaccination after a period of years reveals the fact that there is a falling away from vaccination, and, therefore, a lessened immunity We do not consider that this system of Medical Inspection demands in every case a

positive diagnosis; such diagnosis may in some cases be impossible, but there may be sufficient evidence to mark the case as "suspicious" and the full diagnosis can be made at the proper time by the family physician, to whom the case properly belongs, or in "poor cases" can be treated by the regular physicians of the Board.

In recommending heartily this system, we do so, knowing that it is in no sense an experiment, but a system of tried value. If there is brought to it a high degree of intelligence, it will increase the physician's knowledge and be an aid to him in the most arduous portion of his work, and not least of all it will appeal to the people in bringing our school system to a healthier basis.

SANITARY DIVISION.

The work of this division is performed by fifteen inspectors, appointed by the Board, each having a separate district under his supervision, for which he is held responsible.

In performing these duties, I wish to state that their work for the year has been done in a painstaking and creditable manner.

CONSOLIDATED REPORT OF NUISANCES FOR THE YEAR ENDING DEC 31, 1899

Inspections from complaint book	2,153
" " " verified	1,862
" " " no cause	291
Number of original inspections made	13,004
Total number of inspections made	15,157
Number of written notices served	2,281
Total number of abatements	2,240

Number of verbal notices	7,286
Number of abatements from same	772
Number of hours in court	235

DETAILED REPORT

Wells inspected	61
Wells closed	5
Sewer connections ordered	499
Sewer drains inspected	1,543
Cesspools inspected	273
Alleys inspected	848
Alleys filthy	177
Alleys need repairing	78
Streets need cleaning	288
Areas dirty	463
Cellars dirty	728
Ashes accumulation	613
Garbage accumulation	445
Drainage surface	69
Lots filthy	144
Lots stagnant water	71
Manure accumulation	658
Defective water pipes	425
Houses filthy	58
Houses unfit for habitation	3
Slaughter houses inspected	17
Houses unprovided with privy vaults or water closets	15
Houses with no water supply	120
Houses with roofs defective	54
Hydrants defective	68
Privy houses filthy	368
Privy vaults full	562
Cesspools full	211
Privy houses dilapidated	24
Privy vaults ordered reconstructed	18
Privy vaults ordered out	1,113
Yards inspected	14,015
Yards filthy	942
Plumbing defective	926
Water-closets defective	739
Stables inspected	1,110
Reinspections	7,313

Permits granted to clean privy vaults and cesspools.	413
Privy vaults cleaned.	375
Cesspools cleaned.	38

In January, 1899, one house was found to be unfit for habitation and was burned by direction of the Health Officer, with the consent of the owner.

One Lodging House was found to be unfit for habitation and was ordered closed.

PLUMBING DIVISION.

This division is under the supervision of three practical plumbers, and the work performed by them has been satisfactorily demonstrated.

The following is a summary of the work of this division for the year 1899.

Plans approved	New buildings	764	
	Old buildings	408	
	Total.		1,172
Plans rejected.			192
Water tests made	Passed.	2,490	
	Not passed	154	
	Total.		2,644
Plumbing inspections made	New buildings	1,372	
	Old buildings	546	
	Total		1,918
Final plumbing inspections made	New buildings	1,183	
	Old buildings	609	
	Total.		1,792
Peppermint tests made	Passed	70	
	Not passed	50	
	Total.		120
Sewer permits granted.			1,237
Cesspool permits granted			124
Privy vault permits granted.			55

Relay sewer permits granted	97
Violations served	2
Violations complied with	2
Hours in court	12

MEAT AND LIVE STOCK DIVISION.

This division is under the supervision of two Inspectors: one a veterinarian, whose duty it is to look after the slaughter houses and wholesale meat depots, the other an experienced butcher, whose duty it is to visit all the public and private meat and vegetable markets.

The following is a summary of the work of this division for the year 1899:

SLAUGHTER HOUSES AND LIVE STOCK INSPECTIONS

Cattle	13,153
Calves	19,271
Sheep	20,718
Hogs	6,198
Total	59,340

CONDEMNED

Calves	9
Horses and glanders	9
Carcasses of Beef	6
Cows	2

QUARANTINED

Calves	2
Horses	2

BUTCHER SHOPS VISITED

Number of visits	8,482
Number of carcasses of beef inspected	31,959
Number of lambs and sheep	101,878
Calves	11,474
Swine	12,447

CONDEMNED.

Bob-calves	6
Loins of Pork	10
Bob-calves (lbs	75
Bologna (lbs.)	90
Fish (lbs.)	170
Ducks (lbs.	25
Breasts of Beef	1
Cheese (cases)	3
Pears (baskets)	169

Eleven complaints attended to and adjusted.

In addition to the above Centre Market has been visited daily.

MILK INSPECTOR'S REPORT.

The Report of the Milk Inspector, together with the number of cow-stables inspected and animals licensed, for the year 1899, is as follows:

Number of milk wagons halted for inspection	1192
Number of cans of milk inspected on same	3832
Number of lactometer tests	1811
Number of stores visited	2563
Number of depots visited	15
Number of cans of milk inspected at depots and stores	2316
Number of lactometer tests	1535
Number of samples found suspicious and sent to Chemist for analysis	229
Number of samples of ice taken	1
Number of cow stable inspections	220
Number of animal permits issued	303
Number of animals licensed	1129
Number of samples of vinegar	1
Number of samples of water delivered to the Bacteriologist for examination	4

DISINFECTING CORPS.

This division consists of a chief and five inspectors detailed for that purpose.

The work of this division is all that can be desired under the existing conditions.

The following is a summary of the work performed during the year 1899:

CASES

Diphtheria, including Membranous Croup	1,170
Scarlet Fever	607
Typhoid Fever	515
Small Pox	22
Total	2,314

DISINFECTED

Diphtheria	1,086
Scarlet Fever	306
Phthisis	558
Small Pox	22
Special	85
Total number of houses	2,257
Total number of rooms	5 237
Cubic Feet of Air Space	5,237,000
Number of visits	1,608
Number of nuisances found	319
Number of funerals supervised	52

THE CITY DISPENSARY AND OUT-DOOR POOR DIVISION.

The following is a detailed statement of the services rendered by the different clinics, together with the treatment of what is known as the Out-door Poor Contingent:

PERSONS TREATED AT THE FOLLOWING CLINICS:

Medical	9,255
Surgical	3 404
Diseases of Skin	1,270
Diseases of Children	968

Diseases of Women	522
Diseases of Genito-Urinary Organs	1,278
No. of Vaccinations	12,017
No. of Teeth Extracted	1,481
No. of Clinic Prescriptions	25,946

NO. OF DISTRICT PRESCRIPTIONS DISPENSED AS FOLLOWS:

1st District	837
2nd District	1,099
3rd District	687
4th District	1 029
5th District	1,150
6th District	386
7th District	536
8th District	823
9th District	598
10th District	1,058
11th District	503
Total No of District Prescriptions	8,700

RECAPITULATION.

Total No. of Patients Treated	30,160
Total No. of Prescriptions Dispensed	34,936

SUMMARY OF SERVICES RENDERED BY DISTRICT PHYSICIANS.

	1st Dist.—Dr. W. H. Schopfer	2d Dist.—Dr. H. W. Long.	3d Dist.—Dr. W. M. Goodwin.	4th Dist.—Dr. M. T. Gaffney.	5th Dist.—Dr. M. L. Lefort.—8 months.	5th Dist.—Dr. M. L. L. Welzmiller.—4 months	6th Dist.—Dr. F. Webner.—11 months	6th Dist.—Dr. S. H. Baldwin.—1 month	6th Dist.—Dr. V. Nager.	6th Dist.—Dr. W. Gauch.	7th Dist.—Dr. C. W. Titus	8th Dist.—Dr. H. M. Hart.	11th Dist.—Dr. F. W. Hagney.
Actual No. of houses visited.	379	482	440	1510	348	125	382	23	340	604	331	433	382
Actual No. of [illegible] visited	400	[illegible]	453	[illegible]	355	132	363	24	324	606	340	436	402
No. of [illegible] [illegible]	433	[illegible]	503	[illegible]	388	143	394	30	379	609	376	484	436
No. of sick [illegible] treated [illegible] other [illegible]	3	[illegible]	[illegible]	60	11	0	22	4	2	[illegible]	56	76	[illegible]
Total No. of revisits made.	1188	948	924	1767	840	202	668	65	633	1037	1117	848	865
No. of patients sent to hospital.	32	45	43	42	15	0	18	1	30	28	6	41	4
No. of deaths.	20	20	25	17	7	4	5	0	8	9	2	8	[illegible]
No. of circulars distributed on infant feeding	0	13	2	0	0	0	11	0	0	0	6	4	[illegible]

RECAPITULATION.

	Actual No of houses visited.	Actual No. of families visited	Sick prescribed for.	Found treated by other physicians.	Total No. of re-visits made.	No. of patients sent to hospital.	No. of deaths.	No. of circulars distributed
1st District..	379	400	433	13	1188	32	20	0
2d "	482	508	552	17	948	45	20	13
3d "	440	453	1138	8	924	43	25	2
4th "	1510	1601	385	60	1767	42	17	0
5th "	473	487	531	20	1132	15	7	0
6th "	375	387	424	28	733	19	5	11
7th	340	334	377	2	933	30	8	0
8th	604	601	609	0	1037	28	9	0
9th	331	340	367	56	1117	6	2	6
10th	413	436	184	10	848	41	8	4
11th "	382	402	436	3	805	4	7	5
Total... ..	5729	5954	6341	215	11192	305	128	41

Allow me, in conclusion, to express my sincere thanks to the members of the Board of Health, individually, for their kind co-operation and many courtesies extended to me in the performance of my duties.

I wish also to thank the employees in general for the willing and efficient manner in which they performed their duties.

Yours respectfully,

DAVID D. CHANDLER,

Health Officer.

RECEIPTS AND DISBURSEMENTS OF THE BOARD OF HEALTH FOR THE YEAR ENDING DEC. 31, 1899.

Balance on hand January 1, 1899	$ 3,282 53	
Appropriated by Common Council (Tax Ordinance	15,000 00	
Appropriated by Common Council (Contingent Fund)	35,000 00	
Fines collected (1st Precinct Court) Board of Health cases	350 65	
		$53,633 18

OFFICE RECEIPTS

Filing plans (Plumbing Division).	$ 2,344 00	
Scavenger permits	41 30	
Animal permits.	112 90	
Scavenger licenses	100 00	
Sale of vaccine..	2 50	
Adolph Rohrmann (deceased) Porter at Laboratory Warrant returned, same being unclaimed	40 00	
Reimbursing Board af Health for work done on premises located on Chapel Street	30 50	
Chicken slaughter house permit	1 00	
		$2,732 20

BACTERIOLOGICAL DIVISION

Bacteriological examinations (out of town cases)	$ 19 00	
SALE OF ANTITOXIN.		
69 vials of A. T. at $1.00 per vial	69 00	
288 vials of A. T. at $1.00 per vial, less 10%	259 20	
54 vials of A. T. at $1.00 per vial, less 20%	43 00	390 40
Total receipts		$56,755 78

DISBURSEMENTS.

SALARIES

Health Officer	$ 3,000 00
Clerks (2)	2,400 00
Stenographer	520 00
Supt Bureau Contagious Diseases	1,000 00
Chief Disinfecting Corps	1,000 00
Chemist	1,200 00
Meat Inspectors (2)	2,000 00
Plumbing Inspectors (3)	3,600 00
Milk Inspector	858 00
Sanitary Inspectors (19)	16,269 00
Janitress	180 00
Meteorologist	72 00
	$32,099 00

DISPENSARY.

City Apothecary	1,500 00	
Assistant City Apothecary	887 90	
Dentist.	200 00	
Janitress ...	180 00	
	—$	2,767 90

BACTERIOLOGICAL DIVISION.

Bacteriologist	$ 2,000 00	
Assistant Bacteriologist	666 00	
Culture Collector	750 00	
Porter	410 00	
		3,826 00

DISTRICT PHYSICIANS.

Eleven at $40 per month, each	$ 5,280 00	5,280 00

ISOLATION HOSPITAL

Orderly	$ 720 00	720 00
		$44,686 90

DISBURSEMENTS

SANITARY DIVISION.

Towels for office	$ 1 50
Incandescent lamps for office	1 80
Drilling bottles for Milk Inspector	2 40
Vital Statistics Record	2 75
Exosmoline—Plumbing tests	3 00
Dust pan, sponges, broom, etc	4 22
Newark City Directory	5 00
Binding Laws of New Jersey	5 00
National colors	5 98
Painting and papering Health Officer's Office	6 00
Water bottles for Chemist	6 90
Medical Dictionary	7 20
Uniform buttons	7 50
Rubber boots	13 50
Coal and wood	21 50
Electric buzz fan and repairs	21 75
[illegible] paper, etc	25 00
Inspectors Freeman and Brady (extra services at watershed	30 00

Cleaning privy vault and cesspool (Chapel street premises)	30 50	
Telephone service (Supt. Bureau Contagious Diseases)	35 24	
Advertising expectoration ordinance	43 31	
Incandescent light for office	52 95	
Board of Health signs	55 00	
Report of inspection of watershed 100 copies	57 50	
Carriage hire	63 00	
Telephone service (Health Officer's residence)	64 45	
Annual Report—1898 (500 copies)	65 00	
Office furniture	94 59	
Telephone service (Health Office	141 30	
Board of Health expenses to watershed	159 75	
Inspectors (2) Board and carriage hire at watershed, May to December	246 13	
Stationery and printing	263 96	
Petty cash (postage, car fare, express, telegrams, messenger service, etc	650 00	
Office rent	800 00	
Members of the Board of Health (expenses to Minneapolis—Meeting of American Pub Health Association)	1,000 00	
		$3,993 68

DISPENSARY

Carpenter work	$ 2 00	
Repairing awning	2 50	
City directory	5 00	
Surgical instruments	7 77	
Clinic book	9 50	
Gas	16 90	
Ice	23 10	
Plumbing work	28 60	
Washing towels	43 11	
Coal	49 50	
Insurance	56 25	
Stationery and printing	107 45	
Liquors	138 33	
Vaccine	770 00	
Drugs	1,327 66	
		$3,087 57

DISINFECTING CORPS

Glass gauges for regenerators	$ 2 40	
City Directory	5 00	
Sponges, oilers, etc.	7 81	
Wood Alcohol	8 50	
Printing and stationery	15 00	
Telephone services	22 42	
Disinfectants (Formaldehyde, carbolic acid, chloride of lime, etc.)	413 42	
		474 55

BACTERIOLOGICAL DIVISION.

Refrigerator	10 00	
Window Shades	11 20	
Stationery and Printing	11 25	
Electric Fan	15 00	
Alcohol and carbolic acid	22 42	
Insurance (antitoxin horses)	45 00	
Guinea pigs	84 00	
Shoeing antitoxin horses	93 86	
Petty cash (postage and incidentals	15 00	
Laboratory supplies	178 31	
Plumbing work	347 53	
Board of antitoxin horses and professional services	1,215 95	$2,184 52
		$9,740 32

ISOLATION HOSPITAL.

SALARIES

Extra help during treatment of small pox patients		
Cook	76 00	
Assistant orderly	174 25	
Special officer	266 00	
		516 25

SUPPLIES

Bell for Hospital gate	80
Overalls	1 50
Cotton batting	1 50
Lumber (repairing fence)	2 47
Hardware	5 38
Paint	9 20

Kerosene, oil and tank	9 57	
Lamps and fixtures	9 62	
Wire nettings and window screens	12 51	
Water rent	15 00	
Rubber goods	17 50	
Hardware	17 90	
Bedding	18 03	
Hay and feed	24 63	
Drugs	28 98	
Carriage hire	32 00	
Telephone Service	35 11	
Kitchen utensils (refrigerator, crockery, knives, forks, pans, etc.)	36 46	
Coal	66 26	
Clothing (discharged patients)	120 49	
Building stable (as per contract)	125 00	
Groceries	531 91	
Medical attendance	549 00	2,187 29
Total disbursements		$11,927 61

RECAPITULATION

Receipts—all sources		$56,755 78
DISBURSEMENTS.		
Salaries	$44,686 90	
Supplies	11,927 61	56,614 51
Balance on hand December 31, 1899		$141 27

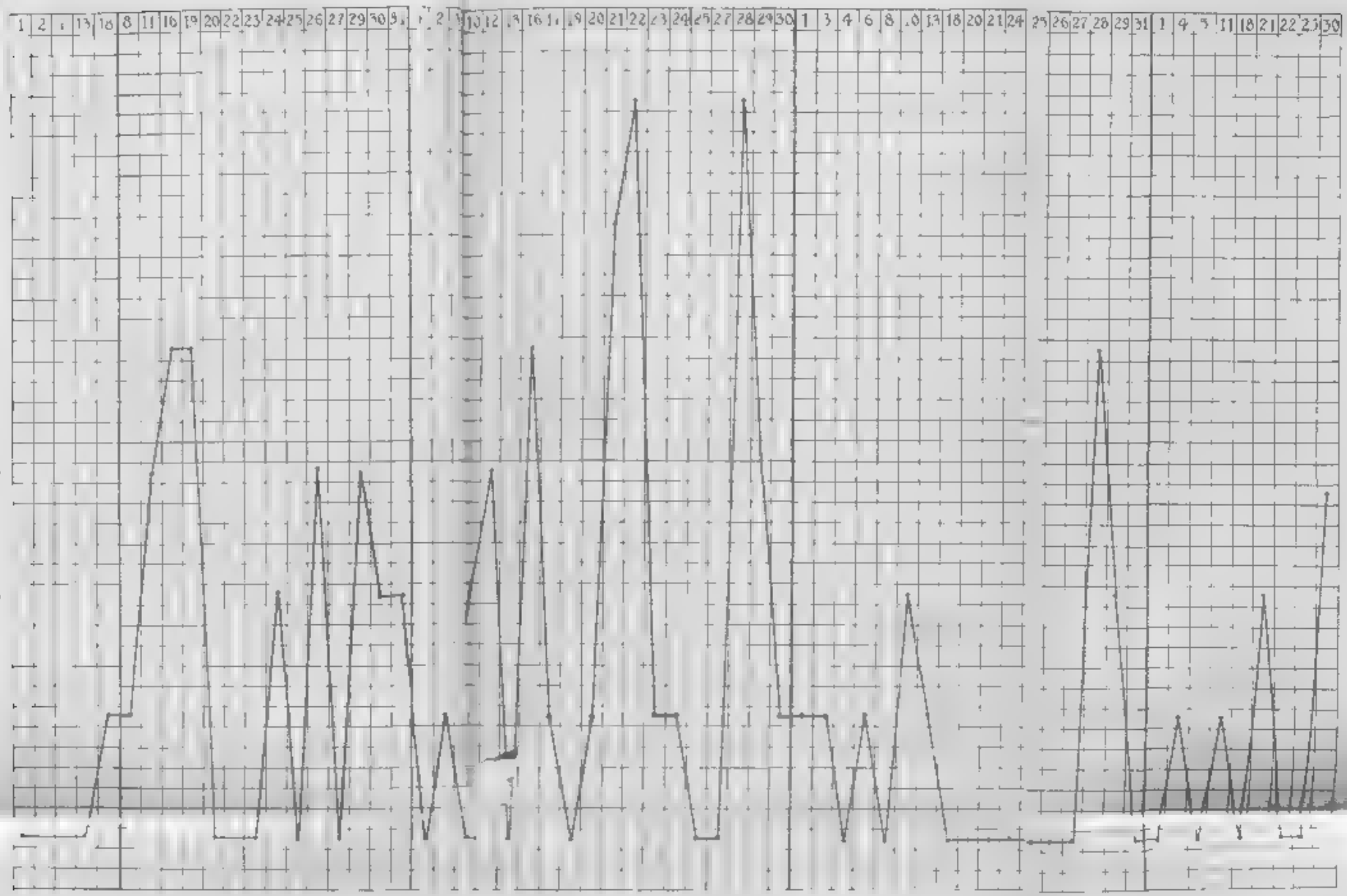
Respectfully submitted,

DAVID D. CHANDLER,

Health Officer.

The following report was read by Dr. H. C. H. Herold, President of the Board of Health, at the meeting of the American Public Health Association, held at Minneapolis, Minn. in November, 1899 :

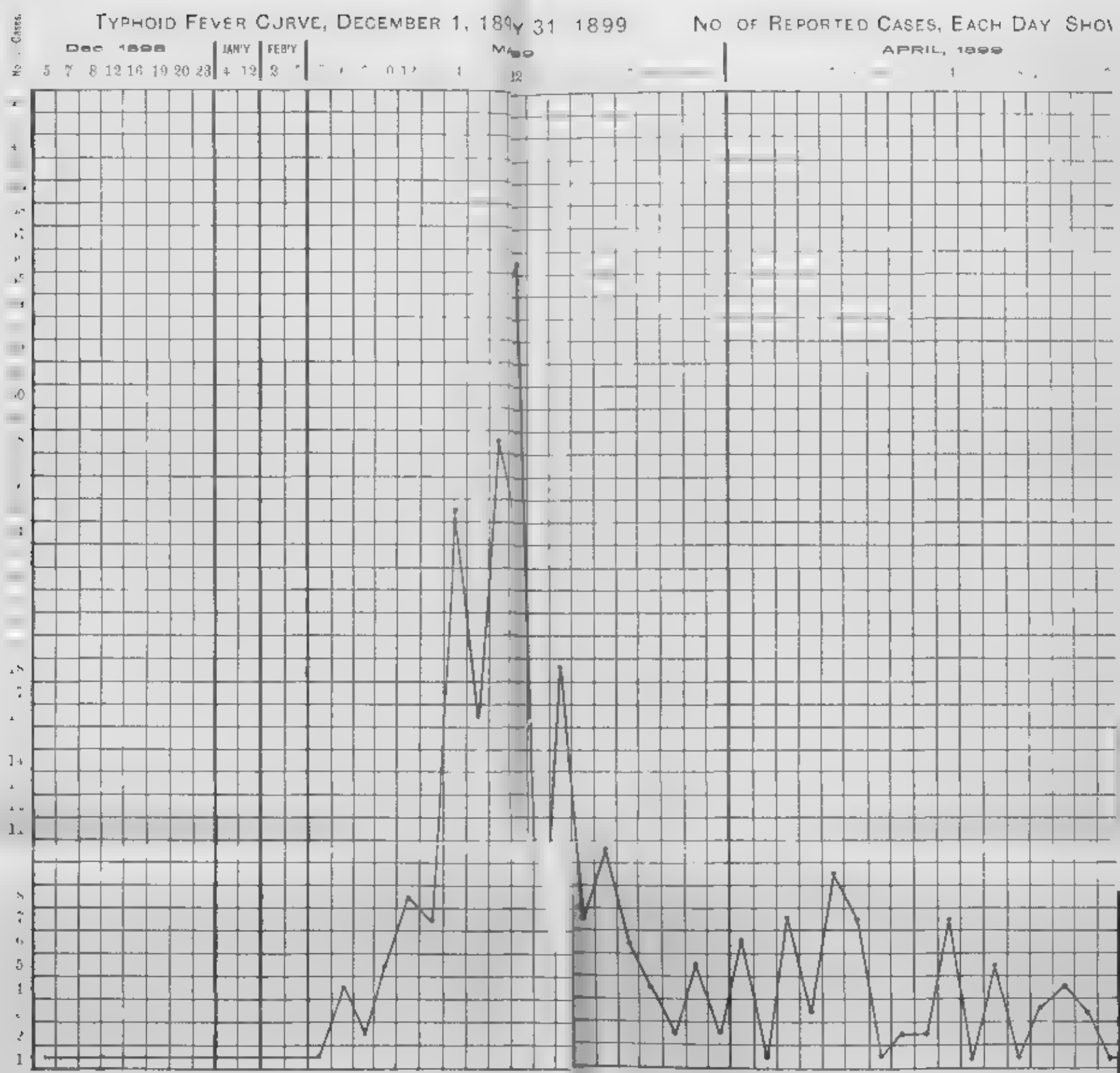
A Table Showing Typhoid Fever Reported Daily from July 1, 1898, to November 30, 1898 148 Cases



	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER
TOTALS	6	33	50	29	15
	1 Soldier	4 Soldiers.	16 Soldiers.	10 Soldiers.	3 Soldiers.

SUMMARY
34 Soldiers.
8 out of town.
106 City Cases.

148


TYPHOID FEVER CURVE, DECEMBER 1, 189 Y 31 1899
NO OF REPORTED CASES, EACH DAY SHOW
No. Cases.
Dec 1898
JAN'Y
FEB'Y
APRIL, 1899
5 7 8 12 16 19 20 23
14

REPORT ON TYPHOID FEVER—NEWARK, N. J.

1898–99.

READ BY DR. H. C. H. HEROLD,

PRESIDENT BOARD OF HEALTH, NEWARK, N. J.

Typhoid fever is one of the diseases which destroys life at its most productive period, and it thus lessens the sum total of the earnings of any community. It is generally admitted that one of the best safeguards of a city's health lies in the purity of its water supply. This fact was long ago recognized by our city authorities, and resulted in the purchase of the "*Pequannock Water System.*" Beginning its use in April, 1892, we can show a steady decrease in typhoid fever, due mainly to the use of this water Before this time our source of supply was the Passaic River If this was shown to be of doubtful quality prior to 1892, it was undoubtedly bad and dangerous to life in 1899, when it was the receiver of the sewage of a half million people discharging seventy million gallons of sewage into its waters.

The evidence of the foulness of the water has been pointed out in various ways, not only scientifically by the chemist and bacteriologist, but also,

FIRST. By the stench of its waters.

SECOND The death of the fishing industry.

THIRD The abandonment of its shores for residential purposes.

We may say in general that any water containing from three grains to ten grains per gallon of sewage refuse, may be considered unfit for use as a potable water. A reference to the report of the Passaic Sewage Commission, 1897, shows in the bacterial tests the constant presence of "coli communis" germs, and these in large numbers. It belongs to a group whose habitat is the intestines,

and some of the members of this group are constantly found in the fæces. It is, therefore, the forerunner and also the adjuvant of the diseases of the intestinal type—say cholera and typhoid fever. "The coli communis found in the normal intestine is seen in greatly increased numbers in typhoid fever" (see Albutts practice, page 792). Some observers like Roux and Rodet believe that the "coli communis" germ, under suitable circumstances, may be converted into the typhoid bacillus.

It is also stated that in ordinary river water the typhoid bacilli rapidly diminish in number.

The presence, therefore, of the "coli communis" germs in large numbers is to our minds sufficient evidence of pollution, and we prefer to use it as a standard of warning of things, which, if not actually present, are not far distant, threatening the health of the community.

Keeping in mind the above observations, let us compare them with the results obtained by a series of bacterial tests, twenty five in number, taken in the latter half of 1896, at various points along the Passaic River, from Paterson to New York Bay.

25 TESTS—JULY 30, '96 TO NOV. 23, '96.

"Coli Communis" present in 22 tests—Not found in 3 tests
Typhoid germ " " 3 " " " "22 "

Observe that the river is absolutely known to be polluted; that the "coli communis" is present generally in large numbers; that the typhoid germ is difficult to find and we can justly infer that its non-discovery does not negative the dangerous quality of the water.

It was in July, 1898, that we noted an appreciable increase in typhoid fever, rising higher and higher in August and September. A typhoid curve was prepared showing the number of reported cases from July 1, 1898, to November 30, 1898. (See table 1.)

Such a general increase points clearly to a general

cause The majority of outbreaks can be traced to contaminated fluids in general use, such as milk or water They affect the health of citizens generally. It was suggested that it was due to the soldiers returning from Cuba; therefore a separate account of these was kept. Notwithstanding the exclusion of the soldiers as a factor, a great increase still existed Repeated examinations of our food and milk supplies did not show sufficient contamination to warrant such an increase. "Enteric fever, due to milk contamination, comes as a rule from some one dairy; the attacks as a rule are simultaneous, favoring the younger members of the family." (Allbutts practice.)

We turn then to the water supply. It was at once suspected that shortages in the daily Pequannock supply were met by turing in Passaic River water, and this has been admitted. As a result our water supply then became Pequannock water diluted with Passaic River. We have shown above that Passaic River water is a sewage water, badly contaminated.

In the light of these facts, the numerous cases of diarrhœa and dysentery, intractable to ordinary treatment, a considerable number of which terminated unfavorably, became easily explainable.

Let us examine the "Reported Cases for 1898." The total for the whole year is 179 cases In the first six months we find only 23 cases. In the last six months 156 cases Of these 150 cases, there were 126 in three months:

Namely—August..	38	cases
September	59	"
October.....	29	"
Total.	126	"

In the corresponding months of 1897, 32 cases were reported :

Namely—August.		7 cases
	September	14 "
	October.....	11 "
	Total	32 "

The average number of cases yearly since 1892 is not much over 100 a fair inference is some pollution, affecting the health of the city at large and introduced some time in July, 1898, raising the reported typhoid cases 80 per cent to 100 per cent. In November, 1898, 16 cases were reported; December, 1898, 8 cases; in January, 1899, 2 cases, February, 1899, 2 cases—28 cases in 4 months.

In February, 1899, came extreme cold weather; to prevent freezing numerous faucets were kept constantly running; a shortage of water ensued, and the city was face to face with a water famine and a possibility of great loss by fire Passaic River water was again introduced into our supply (February 13th-18th) We give the result in our cases.

REPORTED TYPHOID CASES 3 MONTHS.

March, 1899	301 cases
April, 1899	67 "
May, 1899	27 "
Total.	395 "

Again comparing these same months in 1898, we have

REPORTED TYPHOID CASES—3 MONTHS.

March, 1898	2 cases
April, 1898	3 "
May, 1898	3 "
Total.	8 "

Comparing deaths for three months in 1898 and 1899.

DEATHS FROM TYPHOID FEVER.

March, 1898	0	March, 1899	26
April, "	1	April, "	17
May, "	0	May, "	7
Total	1		50

As we glance over the record of reported cases, we find no *one year* of the years in which our new supply has been in use which can in any way show as many cases as occurred in the *single month of March, 1899*. We agree, then, with the report of the bacteriologist to the Sewage Commission (P. 82, Report 1897), who says: "The water of the river is as foul as it possibly can be; its deposit contains elements which, when introduced into the body, are absolutely dangerous to life."

In a monetary estimate, considering loss of time, expenses, etc, we could easily approach half a million dollars; and between the loss by fire of a half a million in property and the loss of a half million by damage to human health and life, there can be but one choice.

LOW PRESSURE DISTRICT—SECTION EAST OF DIVISION LINE

Beginning at Second River, Summer Avenue to Fifth Avenue to Stone Street, Crane, Wood, Sheffield, Eighth Avenue, Boyden Street to Orange Street, High Street, Springfield Avenue, Market Street, Arlington Street, Coes Place to Baldwin Street, Washington Street, Clinton Avenue to Elizabeth Avenue.

TABLE SHOWING TOTAL DAILY CONSUMPTION AND ALSO DAILY AMOUNT PASSAIC RIVER WATER USED FEBRUARY 7 -18, 1899.

Date	Total Daily Consumption.	Passaic River Water
February 7	27,800,000 gallons	
" 8	34,800,000 "	
" 9	40,200,000 "	
" 10	42,200,000 "	
" 11	40,800,000 "	
" 12	36,700,000 "	
" 13	39,200,000 "	3,600,000 gallons
" 14	39,200,000 "	14,700,000 "
" 15	39,000,000 "	17,800,000
" 16	37,900,000 "	16,200,000 "
" 17	32,500,000 "	8,100,000 "
18	30,500,000 "	2,600,000
Total consumption Feb 13-18	218,800,000 "	
Total Passaic River Water ...		63,000,000 "

REPORTED TYPHOID FEVER CASES -1887 TO 1899.

	Jan	Feb	Mch	Apl	May	June	July	Aug	Sept	Oct.	Nov.	Dec.	Tot's
1887	10	14	7	3	7	3	8	20	17	13	13	9	123
1888	14	13	14	17	4	8	10	33	45	49	32	67	302
1889	36	31	17	11	8	8	15	26	22	57	94	203	538
1890	63	23	21	17	16	7	20	10	22	27	34	57	357
1891	55	42	43	18	18	11	15	167	207	137	92	38	874
1892	30	21	14	11	4	4	16	32	30	17	16	17	229
1893	5	3	7	6	8	10	11	26	12	21	7	7	125
1894	2	4	7	7	6	3	3	10	13	21	6	5	88
1895	2	3	2	1	6	4	4	31	38	21	21	15	149
1896	10	5	3	2	3	6	4	14	25	29	7	8	115
1897	5	5	11	7	5	2	8	7	14	11	13	15	103
1898	5	3	2	3	3	7	6	38	59	29	16	8	179
1899	2	2	301	67	27	9	19	28	31	.	...		485

REPORT OF
BUREAU OF CONTAGIOUS DISEASES.

To DAVID D. CHANDLER,
Health Officer.

Dear Sir—I have the honor to present the following report for your consideration, embracing the Contagious Diseases and the Mortality under your charge for the year 1899 :

1st. THE DEATH RATE.

For the year this is fixed at 18 90 per thousand, the estimated population being 240,000. This rate 18 90 is an increase over 1898, whose death rate was 18 30. The following table gives a view of these rates for the past six years :

YEAR.	POPULATION.	NO. OF DEATHS	DEATH RATE.
1894	203,923	4,543	22.28
1895	215,725	4,616	21.37
1896	225,000	4,716	20.96
1897	230,000	4,010	17.43
1898	235,000	4,303	18.30
1899	240,000	4,537	18.90

2d. CONTAGIOUS DISEASES.

1st. *Scarlet Fever* During 1899 there were reported 607 cases of this disease and 34 deaths Comparing with previous years, we have :

YEAR	CASES	DEATHS
1894	1,145	69
1895	623	35
1896	537	17
1897	1,358	54
1898	478	15
1899	607	34

Average mortality for 6 years, 4.7%.

REPORTED CASES BY MONTH.

January	63	July	27
February	41	August	29
March	57	September	32
April	71	October	53
May	75	November	70
June	25	December	66
	Total cases 607		

2d *Typhoid Fever.* The recorded cases and mortality show a great increase over any year since the introduction of the new water supply, the Spring months showing the greatest number of reported cases and deaths. No greater proof of the importance of maintaining the purity of our water supply can be afforded than is shown in the results. A special paper bearing on this disease and the results to this city will occupy another portion of this report. The general statistics are thus summarized

TYPHOID FEVER.

YEAR	CASES	DEATHS
1894	89	34
1895	149	50
1896	106	47
1897	103	33
1898	179	41
1899	515	66

REPORTED CASES TYPHOID FEVER BY MONTHS.

January	2	July	19
February	2	August	28
March	301	September	30
April	67	October	12
May	27	November	10
June	9	December	8

Total cases 1899 515

3d. *Small Pox:* After an absence of five years appeared small pox. As stated in our last report any epidemic will show the accumulation of unvaccinated people in our city Our first case was reported March 17th, 1899. The following table speaks for itself

VACCINATIONS AT CITY DISPENSARY—1899.

March	1 517
April	2,609
May	1,690
June	620
July	72
Total	6,,08

Our first case came from Mecklenburg Co., Virginia, but having been improperly diagnosed as a "Humor of the Blood" was far advanced before it was detected Fully one-half of all our cases may be traced to it; later on in the year it became evident that there were other sources of infection; we have practically no defense from Southern emigration, vaccination in many Southern States being practically neglected. Several peculiarities of this outbreak mark it off from those of previous years, the majority of cases occurred in young adults;

1st. Its peculiar affinity for colored people; out of 22 cases, 20 cases were colored.

2d Its low mortality—in our last epidemic (1894-95) our mortality was 14%, this being below the general average, our results in 1899 were still more favorable, all of our cases recovering.

3d The mild type of case—while the invasion symptoms in some cases were moderately severe, there was a lack of intense prostration; the eruption in some cases scanty and often little or no secondary fever; in some cases scabbing was prolonged and tedious; the severest case occurred in a boy five years old, where there was a marked approach to the confluent type of disease; eruption plentiful and thickly set and symptoms severe; this case was followed by numerous abcesses.

4th. Confusion with other diseases—the difficulty of diagnosis has been considerable, the history not always to be depended upon, and the resemblance to Varicella has been very close indeed; numerous cases of chicken pox have been reported and it seems impossible to draw the line; chicken pox in adults has occurred often enough to cause some uncertainty as to whether it is as rare in adults as the text books lead us to believe; Measles, Syphilis, Acne Indurata and the Eczema of Pediculosis have also been reported.

The public demand in this disease is for the most up-to-date methods, but our facilities for handling this disease remain practically the same as in the previous outbreak A Modern Fever Hospital will go far in removing many difficulties now present.

SMALL POX.

YEAR	CASES	DEATHS
1894	131	18
1895	13	2
1896	0	0
1897	0	0
1898	0	0
1899	22	0

DIPHTHERIA.

During 1899 there were 1,170 cases but only 124 deaths ; a mortality of $10\frac{6}{10}$, while the number of cases was greater than last year (1,019 cases in 1898) the actual number of deaths was less I am satisfied that the public generally appreciate Antitoxin treatment, and its use early and often will still further reduce the mortality Comparing the results under the old treatment, I calculate that in 1899—286 lives were spared to the community, which would have been lost under the old system.

DIPHTHERIA CASES AND DEATHS.

YEAR	CASES	DEATHS
1895	1,321	273
1896	1,261	218
1897	969	137
1898	1,019	133
1899	1,170	124
	5,740	885—$15\frac{4}{10}$%

DIPHTHERIA (ANTITOXIN USED.)

YEAR	CASES	DEATHS	
1895	384	52	.13%
1896	495	54	.11%
1897	563	61	.11%
1898	646	65	$10\frac{1}{2}$%
1899	798	70	$8\frac{77}{100}$%

DIPHTHERIA (ANTITOXIN NOT USED)

YEAR	CASES	DEATHS	
1895	93	221	23%
1896	348	112	31%
1897	406	70	19%
1898	373	65	17.5%
1899	372	44	14 4/10%

DIPHTHERIA (CONTINUED.)

REPORTED CASES BY MONTHS 1899.

January	112	July	87
February	58	August	59
March	52	September	61
April	87	October	137
May	89	November	160
June	51	December	101
	Total		1,111

CONSUMPTION.

These cases are not reportable, but disinfection is regularly practiced in cases of death. During 1899 there were reported 624 deaths. A further education of the public in regard to this disease is desirable, and an extension of the Expectoration Ordinance. The present system of treatment of these cases in the regular Hospitals is only palliative. A system of registration of these cases and an out door system of Sanitarium treatment will be more successful than present methods.

VITAL STATISTICS.

These properly belong to the Board of Health, and are essential to its work. Midwives and undertakers, as well as physicians should conform to a system of registration.

The following is a summary of the chief statistics kept:

1899.

Total Deaths	4 537
Tuberculosis	624
Diphtheria	124
Scarlet Fever	34
Typhoid Fever	66

BIRTHS.

White	6,607
Colored	114
Total	6,721

Rate 28 per thousand.

MARRIAGES.

White	2 027
Colored	63
Total	2,090 Rate 8.60

STILL BIRTHS.

White	277
Colored	2
Not Stated	2
Total	281

CLASSIFICATION OF CHIEF CAUSES OF DEATH—1899.

Consumption	624
Pneumonia	477
Heart Disease	370
Violence	180
Apoplexy	260
Diphtheria	134
Cholera Infantum	160
Other Diarrhœal Diseases	233

Cancer	179
Bronchitis	118
Meningitis	201
Marasmus and Inanition	170
Measles	6
Nephritis	287
Old Age	80
Premature Birth	137
Typhoid Fever	66
Malarial Fever	16
Hydrocephalus	17
Scarlet Fever	34
Septicæmia	14
Croup	3
Alcoholism	15
Whooping Cough	21
All other diseases	700
Total	4,537

THE FOLLOWING IS A TABLE OF THE DEATHS AT ALL AGES.

Under one month	312
Between one month and one year	676
One to five years	503
Five to twenty years	338
Twenty to sixty years	1,702
Over sixty years	910
Undefined	6
Total	4,537

YEAR	POPULATION	NO. OF DEATHS	DEATH RATE
1894	203,023	4,543	22.28
1895	215,725	4,616	21.31
1896	225,000	4,716	20.90
1897	230,000	4,010	17.43
1898	235,000	4,303	18.30
1899	240,000	4,537	18.90

The following table gives the deaths by Wards for 1899. This estimate is based upon a population of 247,448, by Actuary F. L. Hoffman:

WARDS	NO. OF DEATHS	ESTIMATED POPULATION	PERCENTAGE OF TOTAL POPULATION	DEATH RATE PER THOUSAND
1	470	14,847	6 0	31 7
2	219	14,352	5 8	15.3
3	364	22,518	9 1	16.2
4	191	12,373	5 0	15 4
5	279	16,084	6 5	17 3
6	566	16,827	6 8	33 6
7	302	15,589	6 3	19 4
8	177	12,125	4 9	14 6
9	199	12,125	4 9	16 4
10	351	19,302	7 8	18.2
11	290	17,817	7.2	16 3
12	258	16,579	6 7	15 6
13	264	18,311	7 4	14 4
14	325	23,755	9 6	13 7
15	277	14,847	6 0	18 7
Not stated	5			
	4,537	247,448	100 0	18 30

INFECTIOUS DISEASES REPORTED BY WARDS.

WARDS	DIPHTHERIA, INCLUDING MEMBRANOUS CROUP	SCARLET FEVER	TYPHOID FEVER	SMALL
1	71	46	59	2
2	60	22	51	10
3	123	13	11	1
4	35	10	34	4
5	41	24	43	1
6	62	33	14	
7	50	21	15	
8	82	44	51	
9	63	24	31	2
10	71	46	69	
11	97	54	15	2
12	60	25	41	
13	101	42	17	
14	113	61	17	
15	143	82	35	
Totals	1,170	607	515	22

Respectfully submitted,

ED. E. WORL, M. D.,

Supt. Bureau Contagious Diseases

BACTERIOLOGICAL REPORT.

To David D. Chandler,
Health Officer.

Dear Sir:

Herewith is respectfully presented the report of the Bacteriological Division for the year ending December 31, 1899:

During the year no less than 250 different physicians have availed themselves of the services of this division, and it is a source of gratification to be able to report that the number is constantly increasing, thus assuring their continued support of the work which the Board of Health is endeavoring to do in the direction of exact diagnosis.

As may be expected, this large number of physicians have materially increased the usefulness of the Laboratory, and there has been a decided increase in the number of specimens received for examination, as compared with previous years.

The action of the Board of Health in setting aside the large well lighted, and well ventilated room in the New City Hospital building for a laboratory, has provided a very suitable and well appointed place in which the routine work of the division can be carried on, and where additional or original work may be attempted when occasion demands.

One of the most important, and at the same time one of the most difficult subjects which engaged our attention during the past year, was the weekly examination of samples of the city water supply.

In accordance with the resolution passed by the Board of Health early in the year, weekly examinations were made, of samples of the Pequannock water. The samples were obtained by an Inspector of the Board (Mr Thomas E. Freeman), who visited the watershed, taking samples from the intake, at Macopin, and from points above; going directly from there to the Belleville reservoir, where a sample was obtained at the outlet of the pipe line; and at the same time samples of tap water were obtained from the high and low service distributing systems in Newark.

These examinations extend over almost the entire year, and the results, which are given in the accompanying table, may serve as the basis for future work in this direction It is almost unnecessary to say that too much attention cannot be given to our water supply, for there is no substance over which we have control that is more necessary to the health and well-being of the whole community.

The City of Newark is particularly fortunate in the possession of a water supply which it is possible to make almost ideal in purity. To do this there are doubtless some difficulties to be overcome, but they are of such a nature that it is reasonable to expect and to look forward to the time in the near future when the water will be collected on the watershed and delivered at Macopin intake free from any pollution and in as high a degree of

purity as it is possible or desirable to obtain a natural water. If this condition can be brought about, the only addition which the Pequannock water should receive, after leaving Macopin intake, would be the auxiliary supply from the wells at Belleville pumping station; and as these are directly under the charge of the local authorities, there is no reasonable excuse why we should not have a water supply equal, if not superior in purity, to any of its size.

For the benefit of future duplication of the methods employed at the Newark Laboratory in examining water, it has been thought desirable to give a short explanation of the technique:

The samples of water are collected in two ounce glass stoppered bottles, which have been recently sterilized for not less than one and one half hours in an Arnold sterilizer; while the bottles are hot they are put directly into tin cans which also have just been sterilized, and the can is not opened until the sample is about to be taken, when the bottle is removed with a minimum amount of handling and the sample obtained. The bottle after being carefully stoppered is returned to the tin can and brought to the Laboratory where we make it a rule to begin the examination within six hours after the sample has been obtained. This is to avoid the multiplication, which the bacteria originally in the water would undergo, if the time between the taking of the sample and its examination was not very short.

This multiplication of bacteria is constantly going on, though somewhat retarded by the agitation during transmission to the Laboratory.

When the sample is received it is used as soon as possible and several gelatine plates are made using the maximum amount of water for each plate, which the bacterial contents of the sample will permit. This amount varies with each sample and depends on the number of bacteria present, for example, a sample of Passaic River water containing perhaps 50,000 bacteria and upwards per cubic centimeter, we could safely use only $\frac{1}{10}$ cc. to [illegible] in each plate. Whereas a sample of city water containing perhaps 100 bacteria and upwards per cc. we would use one half to one cubic centimeter per plate. A knowledge of the source of the sample is of great aid in determining the amount of water to use in each case, but in all cases some plates should be made with a small amount of the water as well as with the maximum quantity, and the plates are again to be preferred a development on the plates before the colonies can be counted and studied.

At the time the cultures for the plates are being [illegible] fermentation tubes are also inoculated with measured quantities of the water, beginning with the smallest and increasing the amount added to each succeeding tube until ten cubic centimeters of the water is placed in the last. These fermentation tubes each contain one per cent peptone bouillon to which 2 per cent glucose is added, and the reaction is brought to a weak alkaline, as indicated by its producing a distinct purple on turmeric with Spatolo's red litmus paper. We have not found that phenolphthalein as an indicator of the reaction is any more reliable for ordinary use, and its employment requires far more time than well prepared litmus paper.

The measuring is done with graduated pippettes which are selected so that they drop twenty drops to the cubic centimeter and are very useful for this purpose

When the various tubes have been prepared they are incubated for twenty four to thirty hours, and the gas, if any has been produced, is caught in the closed limb of the "U" tube, this gas is then tested with recently prepared hydrate solution, and unless the result shows that at least 25 per cent is CO_2 we have learned not to attach much importance to it as an indicator of fermentation Plate cultures are made by streaking the surface of coagulated blood serum (Loeffler's Medium) with a platinum needle inoculated from the tube containing the minimum amount of water which produced fermentation, and also from the tube containing the maximum amount of water used Petri dishes, in which Loeffler's medium has been coagulated, are very useful for this purpose.

After the inoculated plates have been incubated for twenty four hours they are carefully examined for the Colon bacillus, when it is found, is isolated for identification Particular attention is paid to the plates for any bacteria which may resemble those of typhoid fever It will be found that there is a fairly constant difference between the Colon bacillus and that of typhoid when grown on this medium, the former producing a far more profuse development than the latter Our experience with this method leads to the conclusion that water which will show the presence of the Colon bacillus by fermentation, and subsequent isolation, when one tenth c c or less of the sample is used, should be regarded with suspicion unless we have an intimate knowledge of the source of the pollution, and

water in which no evidence of fermentation is obtained when five c. c. of it has been added to glucose bouillon tubes enables us to give a reasonable assurance that the water does not contain bacterial contamination. Thus frequently in twenty-four hours an opinion can be formed as to the absence, or the probable presence of pollution in a given sample.

In the following table of examinations of the Pequannock water supply, it will be observed that fermenting bacteria are constantly present in samples taken at the watershed; but by the time the water has reached the Newark faucets these germs have to a great extent disappeared; and this is probably due to the fact that the individual germs, which enter the pipe line at the intake, complete their existence without having a chance to undergo reproduction because of the agitation which is constantly going on in the pipes. The great length of the pipe line from Macopin intake to Belleville reservoir materially adds to this important factor, and it will be noticed in the table that the difference between the bacterial contents of the water at Macopin intake and Belleville reservoir is more pronounced than between samples from Belleville reservoir and the City faucets

The sign (+) in the table means fermentation produced

The sign (—) in the table means fermentation not produced

DATE.	ORIGIN OF SAMPLE.	NO. OF BACTERIA PER c	Amount of water causing fermentation in 5 c.c Gas in Durham						
			1/10	1/10	1/5	1/2	1 cc	5 cc	10 cc
Jan. 4, '99	Laboratory faucet, City Hospital.....	381	—	—	—	—	—	+	+
Jan 12, 99	Macopin Intake outside gatehouse	400						+	+
Jan. 12 '99	Macopin Intake, inside gatehouse	560				-	—	+	+
Jan 12, '99	Belleville Reservoir, outside gatehouse	580				-			+
Jan. 12, '99	Laboratory faucet, City Hospital.	410	—	—	—		—	—	+
Jan 19, '99	Macopin Intake, outside gatehouse	600				—		+	+
Jan 19, '99	Macopin Intake, inside gatehouse	540				—		+	+
Jan 19, '99	Belleville Reservoir, outside gatehouse	740		—					+
Jan. 19, '99	Laboratory faucet, City Hospital	170	—		—	—	—	—	+
Jan 26, '99	Macopin Intake, outside gatehouse ...	1570	—					+	+
Jan. 26, '99	Macopin Intake, inside gatehouse..... ...	1540		-	—	—	—	+	+
Jan 26, 99	Belleville Reservoir, outside gatehouse..	950		—					+
Jan 26, 99	Laboratory faucet, City Hospital	1100							+
Feb 2, '99	Macopin Intake, inside gatehouse	360	—	—	—			+	+
Feb. 2, '99	Belleville Reservoir, inlet pipe.....	440	—	—	—	—	—	+	+
Feb 2, '99	Laboratory faucet, City Hospital.....	180	—	—	—			+	+

The sign (+) in the table means fermentation produced.
The sign (−) in the table means fermentation not produced

DATE.	ORIGIN OF SAMPLE	NO. OF BACTERIA PER C. C.	Amount of water causing fermentation in 5 c.c Glucose Bouillon						
			1/20	1/10	1/5	1/2	1 cc	5 cc	10 cc
Feb 10, '99	Belleville Reservoir, inlet pipe	390					−	+	+
Feb 10, '99	Laboratory faucet City Hospital	260					+	+	+
Feb. 15, '99	Passaic River water, inlet No Basin, Belleville	5980	+	+	+	+	+	+	+
Feb. 15, '99	Pump No 4, ground and river water, Belleville	4760	+	+	+	+	+	+	+
Feb. 15, '99	Pump Well, at Belleville	2400	+	+	+	+	+	+	+
Feb. 15, '99	South Basin, small amount of ground water	3960	+	+	+	+	+	+	+
Feb 15, '99	Belleville Dist., at Belleville	2040	+	+	+	+	+	+	+
Feb. 15, '99	Low Service Reservoir, 128 Halsey street.	2140	+	+	+	+	+	+	+
Feb 15, '99	Laboratory faucet, City Hospital	180						+	+
Feb. 16, '99	Bellville Reservoir, inlet pipe	90	−	−	−	−	+	+	+
Feb 16, '99	Board of Health Office, rear room	1980	+	+	+	+	+	+	
Feb. 16, '99	Laboratory faucet, City Hospital	60	−				-	+	+
[illegible]	[illegible]					+	+	+	+
Feb 16, '99	Passaic River inlet, to No. Basin, Belleville	5450	+	+	+	+	+	+	+

Feb. 23, '99	Macopin Intake, at gatehouse	600			+	+	+	+	+	
Feb. 23, '99	Macopin Intake, at Newark Weir	520		—	—	+	+	+	+	
[illegible]	[illegible]	[illegible]								
Feb 23, '99	Board of Health Office, rear room.	430	—		—	+	+	+	+	
Feb. 23, '99	Laboratory faucet, City Hospital	170	—	—	—	—	—	—	+	
[illegible]	[illegible]	[illegible]								
Mch. 2, '99	Macopin Intake, at Newark Weir	880	—	—	—		—	+	+	
Mch. 2, '99	Belleville Reservoir, inlet pipe	1505		—	—		—	+	+	
Mch. 2, '99	Board of Health Office, rear room	2540			—		—	+	+	
Mch 2, '99	Laboratory faucet, City Hospital.	905		—		—	—		+	
Mch 9, '99	Macopin Intake, at gatehouse	780	—	—		—	+	+	+	
Mch 9, '99	Macopin Intake, at Newark Weir	635	—	—	+	+	+	+	+	
Mch 9, '99	Belleville Reservoir, inlet pipe	710	—		—	—	—	+	+	
Mch. 9, '99	Board of Health Office, rear room	1190	—	—		—		+	+	
Mch 9, '99	Laboratory faucet, City Hospital	190			—		—		+	
Mch 16, '99	Macopin Intake, at gatehouse	635	—	—		+	+	+	+	
Mch. 16, '99	Macopin Intake, at Newark Weir	525		—	—	+	+	+	+	
Mch. 16, '99	Belleville Reservoir, inlet pipe	490	—	—		—	+	+	+	
Mch 16, '99	Board of Health Office, rear room	340		—	—		—	+	+	
Mch 16, '99	Laboratory faucet, City Hospital	[illegible]							+	

The sign (+) in the table means fermentation produced.

The sign (—) in the table means fermentation not produced.

DATE.	ORIGIN OF SAMPLE	NO. OF BACTERIA PER C C	Amount of water causing fermentation in 5 cc Glucose Bouillon						
			1/20	1/10	1/5	1/2	1 cc	5 cc	10 cc
Mch. 23, '99	Macopin intake, at gatehouse.....	220		—	—	—	—	+	+
Mch 23, '99	Macopin Intake at Newark Weir	150						+	+
Mch 23, 99	Belleville Reservoir at inlet pipe	130							
Mch 23, '99	Board of Health Office, rear room	90	—	—	—	—		—	—
Mch. 23, '99	Laboratory faucet, City Hospital	70	—	—	—	—		—	—
Mch 30, '99	Macopin Intake, at gatehouse.....	340	—	—	—		—	+	+
Mch 30, '99	Macopin Intake at Newark Weir	240							+
Mch 30, '99	Belleville Reservoir, inlet pipe.....	225	—	—	—	—	—	—	—
Mch 30, '99	Board of Health Office, rear room	215	—	—		-	—	—	—
Mch. 30, '99	Laboratory faucet, City Hospital..... ...	35	—	—	—	—	—	—	—
Apl 13, '99	Macopin Intake, at gatehouse .. .	650				+	+	+	+
Apl 13, '99	Macopin Intake at Newark Weir	355				+	+	+	+
Apl 13, '99	Belleville Reservoir, inlet pipe ..	220						+	+
Apl 13, '99	Board of Health Office, rear room .	237							+
Apl. 13, '99	Laboratory faucet, City Hospital.....	60	—	—		—	—	—	—
Apl 20, '99	Macopin Intake, at gatehouse . ..	425		+	+	+	+	+	+
Apl. 20, '99	Macopin Intake, at Newark Weir	320					+	+	+
Apl 20, 99	Belleville Reservoir, inlet pipe	470				+	+	+	+

Apl. 20, '99	Board of Health Office, rear room ...	220	—	—	—	—	+	+	+
Apl. 20, '99	Laboratory faucet, City Hospital..	185	—	—	—	—	—	+	+
Apl. 27, '99	Macopin Intake, at gatehouse.....	720	—	—	+	+	+	+	+
Apl 27, '99	Macopin Intake, at Newark Weir	620			+	+	+	+	+
Apl. 27, '99	Belleville reservoir, inlet pipe.....	215	—	—	—	—	—	+	+
Apl 27, '99	Board of Health Office, rear room	120	—	—	—	—	—	+	+
Apl. 27, '99	Laboratory faucet, City Hospital	35	—		—	—	—	—	+
May 4, '99	Macopin Intake, at gatehouse.....	640	+	+	+	+	+	+	+
May 4, '99	Macopin Intake, at Newark Weir	580	+	+	+	+	+	+	+
May 4, '99	Belleville Reservoir, inlet pipe.....	420	—	—	+	+	+	+	+
May 4, '99	Board of Health Office, rear room	130			—	—	+	+	+
May 4, '99	Laboratory faucet, City Hospital..	75	—	—	—		—	+	+
May 13, '99	Macopin Intake, at gatehouse.....	895	+	+	+	+	+	+	+
May 13, '99	Macopin Intake, at Newark Weir..... ..	720	—	—	—	+	+	+	+
May 13, '99	Belleville Reservoir, inlet pipe	442		+	+	+	+	+	+
May 13, '99	Board of Health Office, rear room	680					+	+	+
May 13, '99	Laboratory faucet, City Hospital...	302	—	—	—	+	+	+	+
May 19, '99	Macopin Intake, at gatehouse.....	750	—	+	+	+	+	+	+
May 19, '99	Macopin Intake, at Newark Weir....	620	—	—	—	—	+	+	+
May 19, '99	Belleville Reservoir, inlet pipe	220	—	—	—	—	—	+	+
May 19, '99	Board of Health Office, rear room.	180	—	—	—	—	+	+	+
May 19, '99	Laboratory faucet, City Hospital.....	90	—	—	—	—		+	+

The sign (+) in the table means fermentation produced.
The sign (—) in the table means fermentation not produced

DATE.	ORIGIN OF SAMPLE	NO. OF BACTERIA PER C. C.	Glucose Bouillon.						
			1/100	1/10	1/5	1/2	1 cc	5 cc	10 cc
May 27, '99	Macopin Intake, at gatehouse	1135	—	+	+	+	+	+	+
May 27, '99	Macopin Intake, at Newark Weir	865	—	—		+	+	+	+
May 27, '99	Belleville Reservoir, inlet pipe	320	—		+	+	+	+	+
May 27, '99	Board of Health Office, rear room	185	—	—		—		+	+
May 27, '99	Laboratory faucet, City Hospital	98	—	—		—	—	+	+
June 3, '99	Macopin Intake, at gatehouse	945	+	—	+	+	+	+	+
June 3, '99	Macopin Intake, at Newark Weir	760	—		+	+	+	+	+
June 3, '99	Belleville Reservoir, inlet pipe	385	—	—		—	+	+	+
June 3, '99	Board of Health Office, rear room	210	—		—	—	+	+	+
June 3, '99	Laboratory faucet, City Hospital	98	—	—	—	—	—	+	+
June 9, '99	Macopin Intake, at gatehouse	733		+	+	+	+	+	+
June 9, '99	Macopin Intake, at Newark Weir	62				+	+		+
June 9, '99	Belleville Reservoir, inlet pipe	200	+	+	+	+	+	+	+
June 9, '99	Board of Health Office, rear room	125				+	+	+	+
June 9, '99	Laboratory faucet, City Hospital	95		—	—	+	—	+	+

June 17, '99	Macopin Intake, at gatehouse	745		+	+	+	+	+	+
June 17, '99	Macopin Intake, at Newark Weir	500	+		+	+	+	+	+
June 17, '99	Belleville Reservoir, inlet pipe	200	+		+	+	+	+	+
June 17, '99	Board of Health Office, rear room	150	—	—	+	+	+	+	+
June 17, '99	Laboratory faucet, City Hospital	95	—	—	—	—	+	+	+
June 23, '99	Macopin Intake, at gatehouse	580	—	—	—	+	+	+	+
June 23, '99	Macopin Intake, at Newark Weir	520	+	+	+	+	+	+	+
June 23, '99	Belleville Reservoir, inlet pipe	220	—	+	+	+	+	+	+
June 23, '99	Board of Health Office, rear room	160	—	+	+	+	+	+	+
June 23, '99	Laboratory faucet, City Hospital	85	—	—	—	—	+	+	+
July 1, '99	Macopin Intake, at gatehouse	2050		+		+	+	+	+
July 1, '99	Macopin Intake, at Newark Weir	1720	—	—	+	+	+	+	+
July 1, '99	Belleville Reservoir, inlet pipe	270	—	—	—	—	—	+	+
July 1, '99	Board of Health Office, rear office	160	—					+	+
July 1, '99	Laboratory faucet, City Hospital	60				—	—	—	+
July 6, '99	Echo Lake stream, above junction with Pequannock River	1140	—	+	+	+	+	+	+
July 6, '99	Pequannock River, above junction with Echo Lake stream	3445		+	+	+	+	+	+
July 6, '99	Macopin Intake, at gatehouse	835	—	+	—	+	+	+	+
July 6, '99	Belleville Reservior inlet pipe	320	—	—	—	—	+	+	+
July 6 '99	Board of Health Office, rear room	130	—	—	—	+	+	+	+
July 6, '99	Laboratory faucet, City Hospital	42	—	—		—	+	+	+

The sign (+) in the table means fermentation produced.
The sign (—) in the table means fermentation not produced

DATE.	ORIGIN OF SAMPLE.	NO. OF BACTERIA PER C. C.	Amount of water causing fermentation in 5 c.c Glucose Bouillon.						
			1/100	1/10	1/5	1/2	1 cc	5 cc	10 cc
July 15, '99	Echo Lake, above junction with Pequannock River..	2345	—	—	+	+	+	+	+
July 15, '99	Pequannock River, above junction with Echo Lake stream..	1355	—	—	+	+	+	+	+
July 15, '99	Macopin Intake, at gatehouse.	5632	—	+	+	+	+	+	+
July 15, '99	Belleville Reservoir, inlet pipe....	350	—	+	+	+	+	+	+
July 15, '99	Board of Health Office, rear room..... ...	355	—	—	+	+	+	+	+
July 15, '99	Laboratory faucet, City Hospital	105	—	+	+	+	+	+	+
July 21, '99	Echo Lake stream, above junction with Pequannock River.....	930	—	+	+	+	+	+	+
July 21, '99	Pequannock River, above junction with Echo Lake stream.	1420	+	+	+	+	+	+	+
July 21, '99	Macopin Intake, at gatehouse...	1027	—	+	+	+	+	+	+
July 21, '99	Belleville Reservoir, inlet pipe.....	470	+	+	+	+	+	+	+
July 21, '99	Board of Health Office, rear room..... ...	320	+	+	+	+	+	+	+
July 21, '99	Laboratory faucet, City Hospital..... ..	126	—	—	—	+	+	+	+

July 29, '99	Echo Lake stream, above junction with Pequannock River	2060	—	—	+	+	+	+	+
July 29, '99	Pequannock River above junction with Echo Lake stream	730	—	—	+	+	+	+	+
July 29, '99	Macopin Intake, at gatehouse	1220	+	+	+	+	+	+	+
July 29, '99	Belleville Reservoir, inlet pipe	980	+	+	+	+	+	+	+
July 29, '99	Board of Health Office, rear room	430			+	+	+	+	+
July 29, '99	Laboratory faucet, City Hospital	124			+	+	+	+	+
Aug. 4, '99	Echo Lake stream, above junction with Pequannock River	3795	—	+	+	+	+	+	+
Aug. 4, '99	Pequannock River, above junction with Echo Lake stream	1100	—	+	+	+	+	+	+
Aug. 4, '99	Macopin Intake, at gatehouse	[illegible]	+	+	+	+	+	+	+
Aug. 4, '99	Belleville Reservoir, inlet pipe	640	+	+	+	+	+	+	+
Aug. 4, '99	Board of Health Office, rear room	255	—	+	+	+	+	+	+
Aug. 4, '99	Laboratory faucet, City Hospital	350	+	+	+	+	+	+	+
Aug. 10, '99	Echo Lake stream, above junction with Pequannock River	3450	+	+	+	+	+	+	+
Aug. 10, '99	Pequannock River, above junction with Echo Lake stream	4520	+	+	+	+	+	+	+
Aug. 10, '99	Macopin Intake, at gatehouse	2900	+	+	+	+	+	+	+
Aug. 10, '99	Belleville Reservior, inlet pipe	530	-		+	+	+	+	+
Aug. 10, '99	Board of Health Office, rear room	95	—	—	—	—	+	+	+
Aug. 10, '99	Laboratory faucet, City Hospital	120	—	—	—	+	+	+	+

The sign (+) in the table means fermentation produced.
The sign (—) in the table means fermentation not produced

DATE.	ORIGIN OF SAMPLE.	NO. OF BACTERIA PER C. C.	Amount of water causing fermentation in 5 c.c Glucose Bouillon.						
			1/20	1/10	1/5	1/2	1 cc	5 cc	10 cc
Aug. 17, '99	Echo Lake stream, above junction with Pequannock River.	710	-	+	+	+	+	+	+
Aug 17, '99	Pequannock River, above junction with Echo Lake stream	870	—	+	+	+	+	+	+
Aug 17, '99	Macopin Intake, at gatehouse	740	+	+	+	+	+	+	+
Aug. 17, '99	Belleville Reservoir, inlet pipe	420	-	+	+	+	+	+	+
Aug. 17, '99	Board of Health Office, rear room	132	—	—	—	+	+	+	+
Aug 17, '99	Laboratory faucet, City Hospital.	33	—	—	+	+	+	+	+
Aug. 25, '99	Echo Lake stream, above junction with Pequannock River.	820	+	+	+	+	+	+	+
Aug 25, '99	Pequannock River, above junction t Echo Lake stream	790	+	+	+	+	+	+	+
Aug. 25, '99	Macopin Intake, at gatehouse	540	+	+	+	+	+	+	+
Aug. 25, 99	Belleville Reservoir, inlet pipe	520	+	+	+	+	+	+	+
Aug. 25, '99	Board of Health Office, rear room	86	+	+	+	+	+	+	+
Aug. 25, '99	Laboratory faucet, City Hospital	42	—	—		+	+	+	+
Aug 31, '99	Echo Lake stream, above junction with Pequannock River....	690		+	+	+	+	+	+
Aug. 31, '99	Pequannock River, above junction with Echo Lake stream .	1022		+	+	+	+	+	+

Aug 31, '99	Macopin Intake, at gatehouse	947	-	+	+	+	+	+	+
Aug 31, '99	Belleville Reservoir, inlet pipe	370		-	+	+	+	+	+
Aug 31, '99	Board of Health Office, rear room	0[illegible]		+	+	+	+	+	+
Aug 31 [illegible]	Laboratory faucet, City Hospital	70					+	+	+
Sept 7 99	Echo Lake stream, above junction with Pequannock River	505	+	+	+	+	+	+	+
Sept [illegible] 99	Pequannock River, above junction with Echo Lake stream	910	+	+	+	+	+	+	+
Sept 7, 99	Macopin Intake, at gatehouse	1315	+	+	+	+	+	+	+
Sept [illegible]	Belleville Reservoir, inlet pipe	236	+	+	+	+	+	+	+
Sept 7, 99	Board of Health Office, rear room	104	-	+	+	+	+	+	+
Sept [illegible]	Laboratory faucet, City Hospital	100		-	+	+	+	+	+
Sept 14, 99	Echo Lake stream, above junction with Pequannock River	250	+	+	+	+	+	+	+
Sept 14, 99	Pequannock River, above junction with Echo Lake stream	7260	+	+	+	+	+	+	+
Sept 14, 99	Macopin Intake, at gatehouse	430	+	+	+	+	+	+	+
Sept 14, 99	Belleville Reservoir, inlet pipe	490	+	+	+	+	+	+	+
Sept 14, 99	Board of Health Office, rear room	184	+	+	+	+	+	+	+
Sept 14, '99	Laboratory faucet, City Hospital	80		-	-		-	+	+
Sept 21 '99	Oak Ridge stream, above junction with Clinton stream	1295			+	+	+	+	+
Sept 21, 99	Clinton stream, above junction with Oak Ridge stream	2040			+	+	+	+	+

The sign (+) in the table means fermentation produced.
The sign ( ) in the table means fermentation not produced

DATE.	ORIGIN OF SAMPLE.	NO. OF BACTERIA PER C. C.	Amount of water containing fermentation tubes Glucose Bouillon						
			1/100	1/10	1/5	1/2	1 cc	5 cc	10 cc
Sept. 21, '99	Macopin Intake, at gatehouse	2950	+	+	+	+	+	+	
Sept 21, '99	Belleville Reservoir, inlet pipe	950	—	—		—	—	+	+
Sept 21, '99	Board of Health Office, rear room	190	—	—	—	+	+	+	+
Sept 21, '99	Laboratory faucet City Hospital	20							+
Sept 27, '99	Oak Ridge stream above junction with Clinton stream	495	—	—	+	+	+	+	+
Sept 27, '99	Clinton stream, above junction with Oak Ridge stream	320	—	—	+	+	+	+	+
Sept 27, '99	Macopin Intake, at gatehouse	2715	+	+	+	+	+	+	+
Sept. 27, '99	Belleville Reservoir, inlet pipe	1730	+	+	+	+	+	+	+
Sept. 27, '99	Board of Health Office, rear room	215	—	—	+	+	+	+	+
Sept. 27, '99	Laboratory faucet, City Hospital	210	—	—	+	+	+	+	+
Oct. 5, '99	Oak Ridge stream, above junction with Clinton stream	760		—	—	+	+	+	+
Oct. 5, '99	Clinton stream, above junction with Oak Ridge stream	640	—	—	—	+	+	+	+
Oct. 5, '99	Macopin intake, at gatehouse	1270	+	+	+	+	+	+	+
Oct. 5, '99	Belleville Reservoir, inlet pipe	620	-	—	—	+	+	+	+
Oct 5, '99	Board of Health Office, rear room	380	—	—	—	+	+	+	+
Oct 5, '99	Laboratory faucet, City Hospital	270	—	+	+	+	+	+	+

Oct 14, '99	Oak Ridge stream, above junction with Clinton stream	3100	—	+	+	+	+	+	+
Oct. 14, '99	Clinton stream, above junction with Oak Ridge stream	2960	—	+	+	+	+	+	+
Oct. 14, '99	Echo Lake stream, above junction with Pequannock River	4760	—	+	+	+	+	+	+
Oct. 14, '99	Macopin Intake, at gatehouse	3720	+	+	+	+	+	+	+
Oct 14, '99	Belleville Reservoir, inlet pipe	1060		+	+	+	+	+	+
Oct. 14, '99	Board of Health Office, rear room	970	—	—	—	—	+	+	+
Oct 14, '99	Laboratory faucet, New City Hospital	420		+	+	+	+	+	+
Oct 21, '99	Oak Ridge stream, above junction with Clinton stream	3500	—	+	+	+	+	+	+
Oct. 21, '99	Clinton stream, above junction with Oak Ridge stream	3200	+	+	+	+	+	+	+
Oct. 21, '99	Macopin Intake, at gatehouse	4250	+	+	+	+	+	+	+
Oct. 21, '99	Belleville Reservoir, inlet pipe	790	—	—		+	+	+	+
Oct. 21, '99	Board of Health Office, rear room	845	—	+	+	+	+	+	+
Oct 21, 99	Laboratory faucet, New City Hospital	685		+	+	+	+	+	+
Oct. 26, '99	Oak Ridge stream, above junction with Clinton stream	2620	+	+	+	+	+	+	+
Oct. 26, '99	Clinton stream, above junction with Oak Ridge stream	2230	+	+	+	+	+	+	+
Oct. 26, '99	Macopin Intake, at gatehouse	4540	+	+	+	+	+	+	+
Oct 26, '99	Belleville Reservoir, inlet pipe	480	+	+	+	+	+	+	+
Oct 26, 99	Board of Health Office rear room	350	+	+	+	+	+	+	+
Oct 26, '99	Laboratory faucet, New City Hospital	215	+	+	+	+	+	+	+

The sign (+) in the table means fermentation produced
The sign (—) in the table means fermentation not produced.

DATE.	ORIGIN OF SAMPLE	NO. OF BACTERIA PER C C	Amount of water causing fermentation in 5 c.c Glucose Bouillon						
			1/50	1/10	1/5	1/2	1 cc	5 cc	10 cc
Nov. 2, '99	Oak Ridge stream, above junction with Clinton stream...	2740	+	+	+	+	+	+	+
Nov. 2, '99	Clinton stream, above junction with Oak Ridge stream	2320	+	+	+	+	+	+	+
Nov 2, '99	Macopin Intake, at gatehouse...	3760	+	+	+	+	+	+	+
Nov. 2, '99	Belleville Reservoir, inlet pipe....	765	—	+	+	+	+	+	+
Nov 2 '99	Board of Health Office rear room	427	—	+	+	+	+	+	+
Nov 2 ,	Laboratory faucet New City Hospital	32		+	+	+	+	+	+
Nov 9, 99	Oak Ridge stream, above junction with Clinton stream.....	3085	+	+	+	+	+	+	+
Nov. 9, '99	Clinton stream, above junction with Oak Ridge stream.....	3390	+	+	+	+	+	+	+
Nov. 9, '99	Macopin Intake, at gatehouse.....	1530	+	+	+	+	+	+	+
Nov. 9, '99	Belleville Reservoir, inlet pipe.....	1195	—	+	+	+	+	+	+
Nov 9, '99	Board of Health Office, rear room	1065			+	+	+	+	+
Nov 9 '99	Laboratory faucet, New City Hospital	3 0			+	+	+	+	+
Nov. 16, '99	Oak Ridge stream, above junction with Clinton stream....	2340	+	+	+	+	+	+	+
Nov 16, '99	Clinton stream, above junction with Oak Ridge stream	2130	+	+	+	+	+	+	+

Nov 16, '99	Macopin intake, at gatehouse	540	+	+	+	+	+	+	+
Nov. 16, '99	Belleville Reservoir, at inlet pipe	1080	—	+	+	+	+	+	+
Nov 16, '99	Board of Health Office, rear room	720	—	+	+	+	+	+	+
Nov 16, '99	Laboratory faucet New City Hospital	430		+	+	+	+	+	+
Nov. 23, '99	Oak Ridge stream, above junction with Clinton stream	885	-	—	—	+	+	+	+
Nov 23, '99	Clinton stream, above junction with Oak Ridge stream	1985	+	+	+	+	+	+	+
Nov. 23, '99	Macopin Intake, at gatehouse	1695	+	+	+	+	+	+	+
Nov. 23, '99	Belleville Reservoir, inlet pipe	390	+	+	+	+	+	+	+
Nov. 23, '99	Board of Health Office, rear room	590	—	—	+	+	+	+	+
Nov 23, '99	Laboratory faucet, New City Hospital	205			+	+	+	+	+
Dec 1, '99	Oak Ridge stream, above junction with Clinton stream	2125	—	+	+	+	+	+	+
Dec 1, '99	Clinton stream, above junction with Oak Ridge stream	1260	+	+	+	+	+	+	+
Dec 1, '99	Macopin Intake at gatehouse	1800	+	+	+		+	+	+
Dec. 1, '99	Belleville Reservoir, inlet pipe	760	—	—	—	+	+	+	+
Dec. 1, '99	Board of Health Office, rear room	420				+	+	+	+
Dec. 1, '99	Laboratory faucet, New City Hospital	210	—	—	—	—	+	+	+
Dec 7, '99	Oak Ridge stream, above junction with Clinton stream	1970	+	+	+	+	+	+	+
Dec 7, '99	Macopin Intake, at gatehouse	1720	+	+	+	+	+	+	+
Dec. 7, '99	Belleville Reservoir, inlet pipe	630		+	+	+	+	+	+
Dec. 7, '99	Board of Health Office, rear room	370	+	+	+	+	+	+	+
Dec. 7, '99	Laboratory faucet, New City Hospital	180	—	—	+	+	+	+	+

THE AUXILIARY WATER SUPPLY AT BELLEVILLE.

Several series of examinations of samples of the product of the old driven and the new artesian wells at Belleville pumping station were made during the year, and the average results, especially those obtained at the final tests of the new wells, show that the water from this source makes a valuable addition to the City Supply

The accompanying table gives the results obtained in the various examinations, and were made under the conditions described in the preceding report, regarding the methods used :

AUXILIARY WATER SUPPLY AT BELLEVILLE PUMPING STATION

The sign (+) in the table means fermentation produced
The sign (—) in the table means fermentation not produced

DATE.	ORIGIN OF SAMPLE	NO. OF BACTERIA PER C. C.	Amount of water causing fermentation in 5 c.c Glucose Bouillon						
			1/50	1/10	1/5	1/2	1 cc	5 cc	10 cc
Jan. 10, '99	Belleville Suction Well	120	—	—	—	—	—	+	+
Feb. 9, '99	Pump No. 4, Belleville Pumping Station	3750	+	+	+	+	+	+	+
Feb. 9, '99	Passaic River inlet to No. Basin Belleville P. S.	5450	+	+	+	+	+	+	+
Feb. 15, '99	Pump No. 4, Belleville P. S., ground and river water	4700	+	+	+	+	+	+	+
Feb. 15, '99	Passaic River inlet to No. Basin Belleville P. S.	5980	+	+	+	+	+	+	+
Feb. 15, '99	Belleville Pumping Station Suction Well	240	+	+	+	+	+	+	+
Feb. 15, '99	South Basin Belleville P. S., ground water	360	+	+	+	+	+	+	+
Feb. 16, '99	Pump No. 4, Belleville P. S.	3750	+	+	+	+	+	+	+
Feb. 16, '99	Passaic River Inlet to No. Basin Belleville P. S.	5450	+	+	+	+	+	+	+
Feb. 16, '99	Board of Health Office, rear room	1980	+	+	+	+	+	+	+
Feb. 16, '99	Belleville Reservoir Pequannock water	0				—		+	+
Feb. 16, '99	Laboratory faucet, City Hospital	60	—	—	—	—	—	—	+

The sign (+) in the table means fermentation produced.
The sign (—) in the table means fermentation not produced.

DATE.	ORIGIN OF SAMPLE	NO. OF BACTERIA PER C. C.	Amount of water causing fermentation in 5 c.c Glucose Bouillon						
			$\frac{1}{50}$	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{1}{2}$	1 cc	5 cc	10 cc
Apr. 10, '99	New Artesian Well 1500 feet South of South Basin, Belleville P. S.	10	—	—	—	—		—	—
June [illegible], '99	New Artesian Well No. 2, Belleville P. S.	83				+		+	+
June 17, '99	New Artesian Well No. 2, Belleville P. S.	775						+	+
June 19, '99	Old Driven Well's outlet pipe, near river, 1 P. M.	25	—	—	—	—	—	+	+
June 19, '99	Old Driven Well's outlet pipe, near river, 2 P. M.	20	—	—	—	—	—	—	—
June 21, '99	New Artesian Well No. 2, Belleville P. S.	15							
June 21, '99	New Artesian Well No. 4, Belleville P. S.	35						+	+
June 21, '99	New Artesian Well No. 8, Belleville P. S.	57				+		+	+
June 21, '99	New Artesian Well No. 18, Belleville P. S.	625				+	+	+	+
June 21, '99	New Artesian Well No. 20, Belleville P. S.	420					+	+	+
June 21, '99	Old Driven Wells at Belleville P. S.	15	—	—	—	—	—	—	—
June 24, '99	New Artesian Well No. 4, Belleville P. S.	40					+	+	+
June 24, '99	Old Driven Wells at Belleville P. S.	30				+	+	+	+

July 14, '99	New Artesian Well No. 3, Belleville P. S.	284			—	+	+	+	+
July 14, '99	New Artesian Well No 2, Belleville P. S.	46	—					—	
July 14, '99	New Artesian Well No 4, Belleville P S	39			—				
July 14 '99	New Artesian Well No 8, Belleville P S.	75		—		-			
July 14, 99	New Artesian Well No. 18, Belleville P S	49	—			—		-	
July 14, 99	New Artesian Well No 18, Belleville P S.	25			—		-		—
July 14 '99	New Artesian Well No 19, Belleville P S	140			—		—		—
July 14, '99	New Artesian Well No 20, Belleville P S	34			—				—
July 21 '99	New Artesian Well No 3, Belleville P S	480	-	—			—		+
July 21, 99	New Artesian Well No 20, Belleville P. S .	168		—				—	
Aug 9 '99	New Artesian Well No 3 (24 hours old)...	136	+	+	+	+	+	+	+
Aug 9 99	Passaic River water, Belleville P. S	27000	+	+	+	+	+	+	+
Dec. 22, '99	New Artesian Well No. 23, Belleville P. S..	4	—	—	—	—	—	—	—
Dec. 22, '99	New Artesian Well No. 24, Belleville P. S..	24	—	—	—	—	—	—	—
Dec 22, '99	New Artesian Well No. 25, Belleville P S	110		—					—
Dec 22, '99	New Artesian Well No 27, Belleville P S .	7				—	—		
Dec. 22 '99	New Artesian Well No. 30, Belleville P S..	3	—	—	—	—	-	—	—
Dec 22, '99	New Artesian Well No. 31, Belleville P. S..	3	—	—	—	—	—	—	—
Dec. 22, '99	New Artesian Well No. 32, Belleville P. S..	5	—	—		-	—	—	—
Dec. 22, '99	New Artesian Well No. 37, Belleville P. S .	2	—	—	—	—	—	—	—
Dec 22, '99	Combined New Wells from pumps.... ...	362	—	—	-	—	—	—	—
Dec. 22, '99	Combined Old Wells from pumps.....	16	—	—	—	+	+	+	+
Dec 22, '99	Combined Old and New Wells from Weir..	291		-	—	—	—	—	—

PASSAIC RIVER WATER FROM LITTLE FALLS.

During the year several series of examinations were made of samples of water obtained from the Passaic River at Little Falls, and it will be seen by the accompanying table that contamination in the shape of Colon Bacilli is constantly present in the water at this place

The great difficulty of preventing dangerous pollution of the water by communities situated on the river above Little Falls, and the comparatively short distance the water would have to travel in the pipes from this source to the consumer would make this water far less desirable than that obtained from the Pequannock watershed

The sign (+) in the table means fermentation produced
The sign (—) in the table means fermentation not produced.

DATE.	ORIGIN OF SAMPLE.	NO OF BACTERIA PER C. C.	Amount of water causing fermentation in 5 c.c Glucose Bouillon.						
			1/20	1/10	1/5	1/2	1 cc	5 cc	10 cc
Apr 28 '99	Passaic River, at Singac Bridge	755	—	+	+	+	+	+	+
Apr 28, 99	Passaic River, at Beattie's Mills	720	—	+	+	+	+	+	+
Apr 28, '99	Pequannock Water, Laboratory faucet	45						-	+
May 5 '99	Passaic River, above Singac Bridge	640	—	—	+	+	+	+	+
May 5, '99	Passaic River on Singac Bridge	870	+	+	+	+	+	+	+
May 5, '99	Passaic River, at Beattie's Mills	580		+	+	+	+	+	+
May 5, '99	Pequannock water, Laboratory faucet	60	—	—	—	—	—	+	+
May 20, '99	Passaic River above Singac Bridge	730		+	+	—	+	+	+
May 20, 99	Passaic River, on Singac Bridge	890			+	+	+	+	+
May 20, '99	Passaic River, at Beattie's Mills	670			+	+	+	+	+
May 20, '99	Pequannock water, Laboratory faucet	90	—	—	—	—	—	+	+
June 10, '99	Passaic River above Singac Bridge	655	—		+	+	+	+	+
June 10, '99	Passaic River, on Singac Bridge	978	—	—	+	+	+	+	+
June 10, 99	Passaic River gatehouse Little Falls	915		+	+	+	+	+	+
June 10, '99	Pequannock water, Laboratory faucet	60	—		—	—	—	+	+
June 21, '99	Passaic River, on Singac Bridge	445	—	+	+	+	+	+	+
June 21, '99	Passaic River gatehouse, Little Falls	450		+	+	+	+	+	+
June 21, '99	Pequannock water, Laboratory faucet	0					+	+	+

The sign (+) in the table means fermentation produced.
The sign (—) in the table means fermentation not produced

DATE.	ORIGIN OF SAMPLE.	NO. OF BACTERIA PER C. C.	Amount of water causing fermentation in 5 c.c Glucose Bouillon. 1/20	1/10	1/5	1/2	1 cc	5 cc	10 cc
June 24, '99	Passaic River, on Singac Bridge	420	+	—	+	+	+	+	+
June 24, '99	Passaic River gatehouse, Little Falls	430	+	+	+	+	+	+	+
June 24, '99	Pequannock water, Laboratory faucet	90	—	—	—	—	—	+	+
July 7, '99	Passaic River, on Singac Bridge	1225	—	+	+	+	+	+	+
July 7, '99	Passaic River gatehouse, Little Falls	1145	+	+	+	+	+	+	+
July 7, '99	Pequannock water, Laboratory faucet	42	—	—	—	—	—	+	+
July 14, '99	Passaic River, on Singac Bridge	375	+	+	+	+	+	+	+
July 14, '99	Passaic River gatehouse, Little Falls	775	—	+	+	+	+	+	+
July 14, '99	Pequannock water, Laboratory faucet	74	—	+	+	+	+	+	+
July 22, '99	Passaic River, on Singac Bridge	845	+	+	+	+	+	+	+
July 22, '99	Passaic River gatehouse, Little Falls	720	+	+	+	+	+	+	+
July 22, '99	Pequannock water, Laboratory faucet	132	+	+	+	+	+	+	+

FREQUENT SAMPLES WERE NOW TAKEN FROM BELLEVILLE RESERVOIR.

July 24, '99	Belleville Reservoir, inlet pipe	405	+	+	+	+	+	+	+
July 24, '99	Belleville Reservoir, opposite side	275		+		+	+	+	+
July 24, '99	Laboratory faucet, City Hospital	280	+	+	+	+	+	+	+

Aug. 7, '99	Belleville Reservoir, inlet pipe	330	—	+	+	+	+	+	+
Aug. 7, '99	Board of Health Office, rear room	155	—	+	+	+	+	+	+
Aug. 7, '99	Laboratory faucet, City Hospital	40		—	+	+	+	+	+
Aug 8, '99	Belleville Reservoir, at inlet pipe	860	—		+	+	+	+	+
Aug. 8, '99	Board of Health Office, rear room	270	—	—	+	+	+	+	+
Aug 8, '99	Laboratory faucet, City Hospital	105	—	—	—	+	+	+	+
Aug 9, '99	Belleville Reservoir, inlet pipe	1115	—	+	+	+	+	+	+
Aug 9, '99	Board of Health Office, rear room	134	—	—	+	+	+	+	+
Aug 9, '99	Laboratory faucet, City Hospital	50	—	—	—	—	+	+	+
Aug. 11, '99	Passaic River, at Singac Bridge	765	—	—	+	+	+	+	+
Aug. 11, '99	Passaic River gatehouse, Little Falls	1230		—	—	+	+	+	+
Aug. 11, '99	Belleville Reservoir, inlet pipe	302	—	—		+	+	+	+
Aug 11, '99	Board of Health Office, rear room	190	-	—	—	—	—	+	+
Aug 11, '99	Laboratory faucet, City Hospital	125	—	—		—	+	+	+
Aug. 12, '99	Belleville Reservoir, inlet pipe	225	—	+	+	+	+	+	+
Aug. 12, '99	Board of Health Office, rear room	110	—		—	—	—	+	+
Aug. 12, '99	Laboratory faucet, City Hospital	50	—	—	—	—	—	—	—
Sept. 19, '99	Passaic River, at Singac Bridge	735	—	+	+	+	+	+	+
Sept 19, '99	Passaic River gatehouse, Little Falls	675	+	+	+	+	+	+	+
Sept. 19, '99	Laboratory faucet, City Hospital	60	—	—	—	—	—	+	+

DIPHTHERIA ANTITOXIN.

The amount of Antitoxin produced at the Laboratory during 1899 was 1,975 bottles of 10 cubic centimeters each; none of the product was below two thousand units in each bottle and most of it was of higher strength. It has been our aim to produce as nearly as possible a uniform grade of serum, increasing in strength gradually, at the same time keeping the animals which produce it in the best possible condition. Our results seem to justify this course, as the horses used for this purpose are in good physical condition after long service (some of them over five years) constantly receiving injections of toxin and prepared to give Antitoxin whenever required. To attempt, therefore, to produce a very high grade Antitoxin at the risk of injuring the animal's physical condition, does not seem wise, especially when the results of the use of Newark Board of Health serum compare very favorably with those of any other product.

A brief description of the preparation of Antitoxin by the methods employed in the Newark Laboratory may be of interest:

The horse to be used for this purpose is carefully examined and kept under observation by the Veterinarian of the Health Department, Dr. Werner Runge, for several days before it is accepted, in order to make certain that the animal has no organic or other disease; it is tested with mallein for any evidence of latent glanders, and every precaution is taken to obtain only horses that are in the best condition.

Injections of Diphtheria toxin are then begun, using

from one to five drops at first, and increasing the dose as rapidly as the condition of the animal permits until doses of 250 c c to 300 c. c. may be given without producing much constitutional disturbance. This usually requires about twelve weeks, at the end of which time, and not less than ten days after the last previous injection of toxin, some of the animal's blood is drawn from the jugular vein, allowed to clot, the serum removed and tested to deter-termine its Antitoxic value.

At the Newark Laboratory we have found that the most convenient receptacles in which to receive the blood when drawn from the animals, are tubulated Erlenmeyer flasks, which have recently been sterilized in a steam sterilizer; in these flasks (each containing about a liter) the blood is permitted to clot at room temperature, and in forty-eight hours the clot has contracted, having by that time expressed all the serum which may be expected. A carefully sterilized and protected tube is then attached to the tubulation in the flask and by means of a pinchcock the serum is decanted off into previously sterilized bottles, which, together with their stoppers, are kept in boiling water until just before they are used; A piece of gum camphor is inserted into each bottle at the time of filling.

A very ingenious piece of mechanism, originally suggested by Dr. F E. Baker, which permits the serum to be decanted from the large flasks into the small bottles without disturbing the clot, is of great advantage in procuring a clear, transparent product.

The great advantage of this method is that it minimizes the exposure of the Antitoxin, as it comes in contact with nothing but a small piece of easily sterilized

tubing in its transfer from the large clotting flask to the final container where it is practically hermetically sealed.

Each time an animal is operated upon, the product is tested 1st, to prove its sterility; 2nd, to determine its Antitoxic value; 3rd., large doses are injected into animals to prove that the serum contains nothing injurious.

Regarding the remedial value of this agent in Diphtheria, the following table, giving the results of its use during the last five years in Newark, and contrasting the results of the disease in cases where it was not employed, shows that early confidence in the remedy has been justified by experience:

RESULTS OF USE OF NEWARK ANTITOXIN IN DIPHTHERIA.

ANTITOXIN USED.				ANTITOXIN NOT USED			
Year	Cases	Deaths	Per cent	Year	Cases	Deaths	Per cent
1895	384	52	13	1895	937	221	23
1896	905	106	12	1896	356	112	31 4
1897	563	61	11	1897	406	76	18 71
1898	646	68	10.5	1898	373	65	17 42
1899	798	70	8 7	1899	372	54	14.5

TUBERCULOSIS.

The general interest which this disease is attracting in all parts of the world, because of its frightful mortality among all classes and all ages, of almost every community, makes Tuberculosis one of the most, if not the most important of the diseases which come under the notice of

Municipal Boards of Health. Up to the present time little advancement has been made in the treatment and arrest of the progress of the disease; once infection has taken place; prevention and prophylactic measures, therefore, become of the utmost importance

The cause of the disease is so well known and capable of being so positively identified, and the means of transmission from the infected to the uninfected so thoroughly understood, that every effort should be made to popularize the knowledge in order that persons suffering from the disease might be induced to take reasonable precautions against infecting others, and those not infected could guard against exposing themselves.

As is well known the cause of the disease is a very small bacillus or rod shaped germ, which can only be seen by the aid of a very high power microscope; these germs are liberated in enormous numbers in the excretions (i. e. sputum, etc.) of a person suffering with the disease; they retain their vitality for a long time after they have been thrown off, even though the material in which they were originally becomes dry and pulverized The germs eventually find their way into the air we breathe in the form of dust to again infect a fresh victim; this is probably the most common means of transmission, and emphasizes the necessity for precaution, on the part of those exposed to the same surroundings as persons suffering from the disease.

It is a well known fact that infected persons, as a general rule, fail to realize the danger to which they expose the uninfected, and it is the latter, therefore, that must interest themselves in preventing infection by assur-

ing themselves that excretions of patients are properly disposed of, and avoiding unnecessary exposure.

That we are all to a greater or less extent susceptible to this disease is now generally believed, and it is probable that any person will contract the disease if the amount of infection or dose of bacilli taken into the system be sufficiently large and virulent.

The method of examining for the germ of this disease, or the Tubercle Bacillus, as it is called, is to take advantage of the fact that it is very difficult to stain, but when stained, it is equally difficult to remove the stain or decolorize.

Thus the specimen suspected of containing this germ is first stained with a red solution; it is then washed in acid to remove the red color, and then the specimen is stained with blue for contrast; if the Tubercle Bacillus is present it will be found as a red rod while the remainder of the specimen is blue.

The solutions used at the Newark Laboratory for staining Tubercle Bacilli are those suggested by Gabbett, and when carefully made, we have found them very reliable and permanent.

They consist of two solutions the formulæ of which are well known, but are given here for reference

Sol. No. I.

Aqueous Sol Carbolic Acid 5%	95 parts
Alcoholic Sol Fuchsin (basic) 10%	10 "

Sol No II.

Aqueous Sol Sulphuric Acid 25%	100 parts.
Methylene Blue (Grübler's)..... ..	2 "

Properly selected portions of the suspected material are smeared on a glass slide, dried over a flame and

stained for three minutes with Sol. No I. The specimen is then washed in running water and stained for one minute with Sol. No II, again washed in running water and dried. If the specimen has not been injured by overheating before the stains are applied, there should be no difficulty in finding the Tubercle Bacilli. If present they will be stained a bright red on a blue background. This method requires but five minutes for its complete preparation and is so simple as to be very useful for the physician's office

Our experience with the above method leads us to believe, that when carefully prepared specimens from Tuberculous patients are examined, it is possible, from a study of the bacilli found, to draw some conclusions as to the activity of the disease For example if we find that the Tubercle Bacilli present take the red stain indifferently, and are very much beaded and irregular in shape and size, even though quite numerous, we have learned to regard the disease as more or less quiescent and not progressively active.

If, however, we find the Tubercle Bacilli are stout, uniformly stained, and fairly regular in shape and size, in other words such as are found in a vigorous, rapidly growing culture outside of the body, we have reason to assume that the bacilli find conditions in the patient's body favorable to their development, and hence the disease is progressively active when such germs are found

Conclusions drawn from the above observations are most serviceable in the earlier stages of the disease, when the effects of change of treatment or of climate may be determined.

The following analysis of the cases of Tuberculosis examined at the Laboratory during the past year has been prepared by Dr. R. C. Ribbans, the Assistant Bacteriologist of the Board of Health, and shows the distribution of cases as well as age, and character of occupation :

To The Bacteriologist,

Dear Sir —

During the year we have examined 799 specimens of sputa sent in by physicians, who have suspected or have made the diagnosis of Pulmonary Tuberculosis. Of this number—308 cases or 43% were found to contain Tubercle Bacilli ;

16 cases the diagnosis by physicians was questionable ;
75 " " " " " " not given ,
51 " " " " " " some other pulmonary disease.

In 42½% of our true cases the diagnosis was more or less obscure and we were able to greatly assist the physician in making a positive diagnosis.

On examining the data furnished by the physicians, the age and sex were given in 238 cases arranged, as follows

Age.	Male	Female.
Under 10 Years	0	0
10-15 "	1	0
15-20 "	6	9
20-30 "	58	25
30-40 "	50	29
40-50 "	21	13
50-60 "	16	5
60-70 "	0	3
Over 70 "	1	1
	153	85

Between 20 and 40, the most useful period of life, will be found the greatest number of cases. Over 70% occur during these years. Indoor life seems to predispose to this dreadful disease. In 181 cases we find that

Indoor occupation cases were

Male.....105 Female..... 40

Outdoor occupation

Male..... 27 Female..... 0

OCCUPATION.	CASES.
Agents (Insurance)	1
Butcher	1
Bartenders	4
Brewers	1
Bookkeeper	1
Barbers	3
Brass Moulder	1
Carpenters	3
Clerks	18
Corset Mfg	1
Cooks	4
Conductors	5
Cooper	1
Coal Dealer	1
Cutter (Cloth)	1
Cigar Mfgs	2
Drivers	5
Druggists	2
Dressmaker	1
Engineers (Stationary)	2
Engineer (Civil)	1
Firemen	2
Florist	1
Gas Man	1
Grocer	1
Housework	37
Harness Maker	1
Hatters	5
Iron Filer	1
Instrument Mfg	1
Jewelers	4
Japaners	2
Laborers (Miscellaneous)	29

Leather Worker.	1
Letter Carrier.	1
Machinists.	3
Merchant	1
Messengers.	2
Medical Men	2
Mason	1
Nurse	1
Painters House	2
Paper Hanger	1
Plumbers	2
Policeman	1
Printer.	1
Pressman	1
Stevedores.	7
Shipbuilders	1
Shoe Worker	1
Shoe Mfg	2
Solicitor	1
Stockbroker	1
Stone Cutter	1
Street Man	2
Tailor	2
Telegraph Agent	1
Teamster	1
Tool Mfg	2
Traders	3
Thread Maker.	1
Telegrapher.	1
Tanner.	1
Upholsterer	1
Waiters	2
Watch Mfgs	1

We find in this list that the majority occur in occupations which bring the one affected in close contact to the masses, thus offering a greater chance for advancing the disease.

Of the 308 Tubercular cases we find that the immediate family was affected in about 20%. Direct contagion may have taken place in this way

The duration of the disease at the time of examination is shown in the table below

1 week to 1 month	20 cases
1 month to 3 months.	35 "
3 months to 6 months	35 "
6 months to 1 year .	30 "
Over 1 year .	45

The Tubercle Bacilli are found very early in the disease and much more readily as the disease progresses

Judging from the locality in which we find most of our cases of Tuberculosis, we would say that the middle class of people are among the majority of the ones affected.

The cases are scattered all over our city, the residences being on 139 different streets.

Of 230 cases, of which we are able to locate by wards, we find about 2/3 live west of the line drawn down Bloomfield Avenue High Street, to Clinton Avenue

WARDS.	CASES.
1	8
2	15
3	21
4	14
	7
6	23
7	25
8	10
9	3
10	17
11	19
12	11
13	22
14	13
15	15

Tubercular disease is fast spreading in our city, and deaths from the same are increasing at an alarming rate.

Deaths from this disease exceed in number the deaths from Diphtheria and Scarlet fever combined

ROBT. C. RIBBANS, M. D.
Assistant Bacteriologist.

The following table gives the routine work of this Division for each month during 1899, and serves to show the monthly variations in the different diseases which come under our notice

	Jan	Feb	Mar	Apr.	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Diphtheria Examinations													
Primary cultures	163	161	161	110	128	112	115	85	74	157	215	222	1,583
True cases....	75	42	50	65	76	53	71	41	41	102	123	106	845
Primary and secondary cultures	2[illegible]	184	192	204	202	251	214	160	144	208	443	415	2,907
Diphtheria Antitoxin.													
No. [illegible] was produced	341	0	44	64	17	2[illegible]	[illegible]	32	[illegible]	[illegible]	486	0	1[illegible]5
No. of vials used in physicians	1[illegible]	[illegible]	108	[illegible]	91	[illegible]	8	7	61	210	231	185	1,500
Tuberculosis Examinations													
Tubercle Bacilli found....	34	30	34	2[illegible]	33	21	15	22	25	22	18	28	30[illegible]
Tubercle Bacilli not found	6[illegible]	54	64	43	63	3[illegible]	1[illegible]	31	30	28	31	30	4[illegible]
Typhoid Blood Examinations.													
Positive reactions	1	0	165	28	10	8	17	2	17	6	11	8	293
Suspicious reactions	0	0	17	2	2	1	[illegible]	[illegible]	[illegible]	[illegible]	2	1	4[illegible]
Negative reactions.	13	9	84	57	37	39	33	40	27	20	12	13	384
Water Examinations													
No. of specimens	19	22	33	24	29	56	70	55	35	25	30	18	416

Respectfully submitted,

R. N. CONNOLLY, M. D.,

Bacteriologist.

CHEMIST'S REPORT.

To DAVID D. CHANDLER,
Health Officer.

DEAR SIR I herewith present my Annual Report for the year ending December 31, 1899 :

MILK.

The total number of milk analyses made during the year was 221. The samples, with four or five exceptions, were taken from venders without any special reason for suspecting adulteration, and may thus be considered representative of the milk supply of the city. In case a milk is found to be below the State standard, a warning letter is sent to the dealer, and his milk in the future is usually found good Sometimes it happens that perfectly pure milk, as it comes from the cow, is below the standard of 12 per cent. of total solids, but different feeding will remedy this, and a letter, to even an innocent violator of the law, will almost invariably be followed by better milk In cases where adulteration is found, and there is sufficient evidence, suit is brought against the offender and upon conviction a fine of fifty dollars imposed It speaks well for the quality of our milk supply that so very few suits have been necessary in enforcing the milk law.

MILK ANALYSES.

The results of the analyses of the 221 samples of milk examined have been classified and tabulated, as follows :

CLASSIFIED TABLE OF MILK ANALYSES

[illegible] Fat [illegible]

Solids.	Fat.	Solids.	Fat.	Solids.	Fat.	Solids.	Fat.	Solids.	Fat.	Solids.	Fat.	Solids.	Fat.	Solids.	Fat.
13 54	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3 85
[illegible]	4 10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13 41	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	13 05	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	12 77	[illegible]	[illegible]	4 05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	13 31	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13 32	[illegible]	13 03	[illegible]	[illegible]	4 00	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12 55	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12 54	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3 55

CLASSIFIED TABLE OF MILK ANALYSES Continued.

Samples having a percentage of total solids between 12 and 12 50 Average 12 267 Fat 3 597

Solids	Fat.	Solids	Fat.	Solids	Fat.	Solids	Fat.	Solids	Fat.	Solids	Fat.	Solids	Fat.	Solids	Fat.
12 21	3 55	12 30	3 50	12 41	3 [illegible]	12 47	3 5	12 47	3	12 31	3 80	12 13	3 75	12 13	3 60
12 21	3 70	12 35	3.45	12.17	3 50	12 15	3.15	12.40	3 65	12.25	3 60	12 18	3 75	12 12	3 55
12 32	3 65	12 26	3 15	12.14	3.40	12 17	3.15	12.16	3.55	12 22	3 80	12 36	4.05	12.12	3.10
12 47	3 [illegible]	12 [illegible]	3 40	12 27	3 50	12 41	3 20	12 27	3 [illegible]	12 [illegible]	3 80	12 [illegible]	4 10	12 35	3 55
12.12	3 25	12 43	3.90												

Samples having a percentage of total solids below 12 Average 11 476 Fat 3 1 5

Solids	Fat.	Solids	Fat.	Solids	Fat	Solids	Fat.	Solids	Fat	Solids	Fat.	Solids	Fat.	Solids	Fat
1 44	3 50	11 [illegible]	3 40	1 05	3 15	11 [illegible]	3 [illegible]	11 81	3 [illegible]	11 71	3 [illegible]	11 79	3 [illegible]	11 98	3 6[illegible]
11 31	3 10	11 73	3 [illegible]	11 31	2 [illegible]	11 [illegible]	3 0[illegible]	11 7[illegible]	3 [illegible]	11 32	3 3[illegible]	11 [illegible]	2.[illegible]	11 78	2 9[illegible]
10 53	2 7[illegible]	11 24	2 45	1 [illegible]	2 [illegible]	11 6	3 3[illegible]	11 3[illegible]	[illegible]	11 40	2 9[illegible]	1 5[illegible]	2 6[illegible]	11 98	3 10
11 95	3 [illegible]	[illegible]	2 [illegible]	11 3	2 [illegible]										

The plan adopted in the table is the same as in former years, e. g., the arrangement into three classes over 12.50 per cent., between 12.50 per cent. and 12.00 per cent. and under 12.00 per cent. of total solids. In addition, the percentages of fat, as obtained by the Babcock method, are included, the amount of fat giving a better idea of the commercial value of milk than the total solids.

The average percentage of solids for all the milk, including that below the standard, is 12.75, a very satisfactory figure; and yet, one that ought not to be lower.

The general average for fat is 3.80 per cent., which is very good.

The present data, as compared with the two former years may be found in the following table:

COMPARISON TABLE.

Year	1897	1898	1899
Number of samples analyzed	136	178	221
Percentage of samples in 1st Class	69.12	70.22	72.40
Average percentage of total solids	13.24	13.24	13.06
Average percentage of fat			3.95
Percentage of samples in 2d Class	21.32	14.15	15.38
Average percentage of total solids	12.23	12.35	12.27
Average percentage of fat			3.60
Percentage of samples in 3d Class	9.56	15.73	12.22
Average percentage of total solids	11.61	11.58	11.48
Average percentage of fat			3.11
Average percentage of total solids (all samples)	12.87	12.82	12.75
Average percentage of fat (all samples)			3.80

It will be noticed that there is a marked uniformity between the results obtained from year to year, both as regards the general average and the averages of the different classes It is a source of satisfaction to find that seventy per cent of the milk has an average of over 13 per cent. of total solids and about 4 per cent of fat.

It is also rather surprising that the fat in the samples below the standard should average over 3 per cent, and strongly suggests the practice of adding water to a very rich milk until it shows considerably over 100 on the lactometer, an instrument used by dairymen and the Inspector By this means it is possible to obtain a milk of fairly good quality, which would be passed by the Inspector's tests

MILK SOLD FROM CANS

It has often been contended by the dealers and in court, that milk sold from cans, by dipping out small portions at a time, gradually depreciated in quality by reason of a constant removal of cream from the upper part This contention, according to several tests I have made, is not true, and to remove any possible doubt, I give below the results of a large number of experiments made by a noted English authority for a large dairy concern in England. The experiments extended over a period of two seasons, and their object was to have a check on the drivers and prevent them watering the milk en route and making an extra profit for themselves Samples were taken before starting out, during the delivery and at the end of the route. The very large number of 18,000 samples were thus examined :

TOTAL SOLIDS

	1st Season. 7,000 samples.	2d Season 11,000 samples.
*Before starting	12.75	12 84
During delivery	12 74	12.88
At end of route	12 81	12.92

*Analyses made by Dr. Vieth, England

It will be noticed that there is actually a slight improvement in the quality of the milk at the end of the route. This is easily and properly accounted for by the slow evaporation of the water from the milk, making the fluid a little more concentrated.

PRESERVATIVES.

The chief preservatives formerly used in milk were carbonate and bicarbonate of soda, borax, boric acid and salicylic acid. Of late years a solution of formaldehyde has almost entirely superseded them on account of its high efficiency. It is sold in various states of purity under a number of different names, among which are "Freezine," "Freezaline," "Preservaline," "Callerine" and "Anti sour." One part of real formaldehyde in thirty or forty thousand parts of milk is sufficient to prevent souring for two or three days.

The question is to whether or not the small amount of formaldehyde necessary to preserve the milk is injurious to health has been debated for some time; but no matter what the decision, the practical fact remains, and all sanitarians agree, that the addition of that or any other substance to milk is a bad practice and ought to be stopped.

The fact that preservatives are not specially prohibited by the milk law, has raised some question about the power of the Board to prosecute cases of adulteration of this kind, but the State Board of Health has found sufficient authority under the section which prohibits the "addition of water or any other substance or thing" to milk

COMMERCIAL VALUE OF MILK

In the business world it would be considered most extraordinary for a customer to get for a fixed price goods varying 50 to 100 per cent in actual value from day to day Yet this is exactly what is happening daily in the milk trade For practical purposes the percentage of fat in milk determines its commercial value This may range from 3 to 6 per cent, and averages nearly 4 per cent The retail price of milk is fixed, usually, without any regard to its quality, and the producer, usually in ignorance of the fact, often sells milk really worth half as much more than he gets for it or vice versa.

The large creameries now pay for milk according to the amount of fat it contains and some of the large producers have found out that it pays to try to produce milk to contain the most fat at least cost.

THE SANITARY CONTROL OF MILK

Most of the laws passed, regulating the sale of milk, have had for their object the prevention of commercial fraud, and the question of the healthfulness of the article has received comparatively little attention. It makes but a few cents difference to the dishonest dealer who adds five or six quarts of water to his can of milk, but it makes

a difference of sickness and death and thousands of dollars to his customers if he took that water from a Typhoid infected source.

The danger from the use of milk produced under unsanitary conditions is far greater than from the occasional addition of water or abstraction of cream, excepting, as above mentioned, when polluted water is used.

This State and a few others have some legislation respecting the production of milk with a proper regard for sanitation, but it is not strictly enforced and it is very rarely that a suit is brought for violations of this kind

THE CITY WATER SUPPLY.

The City Aqueduct Water has been subjected to considerable adverse criticism by the public which, so far as can be judged by the analytical data, was unjust Not taking into account its admixture with Passaic River water, for a short time, which unfortunate occurrence will be discussed later, the City Water Supply has been of very constant composition throughout the year The variations occurring being mainly in matter of total solids and color, due to the degree of concentration determined by the rainfall.

The color of the water is, in my opinion, its worst feature A dark color at once suggests bad odors and bad tastes, and the public at large is then often a victim of the imagination in judging of the real quality of the water However, the imagination is not always at fault, for at times the physical properties of the water are not inviting but such conditions are always temporary and

usually local, and really have little or no bearing on its healthful quality.

During the summer months there was much complaint about odor and taste This had some foundation in fact, and an investigation of the matter by Prof A R. Leeds, of Stevens' Institute, showed that this condition was due to the presence of large growths of certain kinds of Alga in the water, and particularly in the Oak Ridge reservoir. This made little, if any, difference in the analytical results and was only discovered by microscopical examination.

These abnormal growths of Alga in water have occurred in a number of public supplies and have aroused popular prejudice against the water; but so far as known they are not injurious to health.

The analytical data from the monthly examinations of the City Water will be found in the next table, and in the table following is a series of analyses of water from the gatehouse, at Belleville, the end of the pipe line, the beginning of the pipe line at Macopin Intake and the Board of Health office.

ANALYSES OF NEWARK AQUEDUCT WATER

(PARTS PER 100,000).

	Date 1899	Free Ammonia	Albuminoid Ammonia	Chlorine	Nitrogen as Nitrites.	Nitrogen as Nitrates.	Hardness	Total Solids	Loss on Ignition	Fixed Mineral Matter	Color	Temperature F°
[illegible]	[illegible]	21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	31	37
[illegible]	[illegible]	21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	30	3
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	40	37
"	"	[illegible]	[illegible]	12			[illegible]	[illegible]	[illegible]	[illegible]	50	[illegible]
"	"	May 23	.0016	.0071	.15	none	.0060	2.30	4.05	1.45	2.60	.28	57
"	"	June 21	.0010	.0110	.18	none	.0060	1.50	3.30	1.25	2.05	.19	67
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.50	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
"	"	August 2	.0012	.0130	.15	.0003	.0100	1.40	4.15	1.75	2.40	26	
"	"	August 22	.0028	.0120	.13	none	.0040	1.60	3.00	1.60	1.40	22	73½
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
"	"	October 21	.0028	.0219	.19	none	.0060	2.80	5.50	2.60	2.90	45	60
"	"	Nov 29	.0040	.0162	.16	.0003	.0070	3.00	5.65	2.25	3.40	40	45
"	"	Dec 21	.0037	.0130	.22	.0003	.0170	2.70	5.85	2.00	3.85	.46	40
Average			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4.457	1.878	2.514	305	[illegible]
Average for [illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		4.43	[illegible]	[illegible]	345	
Average for 1897.....			.0022	.0141	.133	trace	.0112	....	4.12	1.99	2.13	330	

ANALYSES OF PEQUANNOCK RIVER WATER

(PARTS PER 100,000)

Sample Taken From	Date—1899	Free Ammonia	Albuminoid Ammonia	Chlorine	Nitrogen as Nitrites	Nitrogen as Nitrates	Total Solids	Loss on Ignition	Fixed Mineral Matter
Belleville Reservoir	August 7	0018	0137	.14	.0001	0070	3 60	1 70	1 [illegible]
Board of Health Office	" 7	.0018	0137	.15	0001	.0070	4 [illegible]	2 [illegible]	2 15
Belleville Reservoir	" 8	0018	0132	.15	.0001	.0060	3 95	2 15	1 80
Board of Health Office	" 8	0015	0[illegible]	13	000	0[illegible]0	3 [illegible]	1 85	1 75
Belleville Reservoir	" 9	.0030	0125	.15	.0001	.0060	3 25	1 65	1 60
Board of Health Office	" 9	.0021	.0125	.14	.0001	0060	4 00	1 [illegible]	2 4[illegible]
Belleville Reservoir	" 10	0019	.0120	.20	.0001	.0055	3 25	1 30	1 95
Board of Health Office	" 10	0015	0120	1[illegible]	0002	055	3 [illegible]	1 0	2 35
Belleville Reservoir	" 11	.0028	0120	.20	.0001	.0075	3 25	1 50	1 75
Board of Health Office	" 11	.0028	.0122	.15	.0006	.0060	4 00	1 50	2 50
Belleville Reservoir	" 12	0019	.0130	.15	0007	0065	3 [illegible]	1 65	2 20
Board of Health Office	" 12	002[illegible]	012	19	trace	0060	3 80	1 65	2 1[illegible]
Macopin Intake	" 25	.0018	0124	.13	0004	0040			
Echo Lake Brook	" 25	.0036	.0104	.17	none	.0100	1 40	3 00	1 40
Pequannock River	" 25	0040	0110	.15	trace	.0040			
Belleville Reservoir	" 25	0042	0104	14	.0001	0040			
Board of Health Office	" 25	0084	0130	13	0002	040	..		
Macopin Intake	" 31	.0021	0109	.14	.0001	.0030			
Belleville Reservoir	" 31	0024	0144	22	0004	0030			
Board of Health Office	" 31	0005	0070	13	none				
Macopin Intake	Sept. 7	.0040	0160	17	...	.0060			
Belleville Reservoir	" 7	.0022	.0110	19		0040			

The averages for 1897 and 1898 are included in the above table of monthly analyses, and it will be noticed that they are in close uniformity with that of the present year. A most satisfactory difference, however, is a gradual improvement in the color.

The results from the series of analyses made in the month of August show that there are slight changes in the water from day to day, and even in the samples from the Belleville Reservoir and the Board of Health office on the same day The sample from Echo Lake Brook was found to contain about twice as much mineral matter as the other samples.

THE SPRING WATER COMPANIES.

The occasional bad appearance of our Aqueduct water has been taken advantage of by a number of private concerns to put upon the market large quantities of water, advertised to come from springs of more or less note, and to have various medicinal properties Most of these waters, perhaps all, are probably safe for potable use but I can see no reason why they should not be subject to constant supervision by the Board the same as the water from wells or other sources The methods of advertising, adopted by some of the concerns, tend to work an injury to the city by their unwarranted reflections on the public water supply

PASSAIC RIVER AT LITTLE FALLS.

The large increase in consumption of Aqueduct water made it necessary for the City authorities to make provision for a temporary increased supply One plan con-

templated the use of Passaic water taken from Little Falls and another the sinking of a number of wells at Belleville. Although a pipe line has been constructed and wells have been sunk, through economy in consumption, neither of these plans have as yet been carried into effect; but a number of analyses of water taken from the river at Little Falls were made and, together with the analyses of water taken at Belleville, are tabulated below.

ANALYSES OF PASSAIC RIVER WATER AT LITTLE FALLS AND BELLEVILLE

Sample Taken From	Date 1899	Free Ammonia	Albuminoid Ammonia	Chlorine	Nitrogen as Nitrites	Nitrogen as Nitrates	Loss on Ignition	Fixed Mineral Matter	Total Solids
Singac	Apr	.21		4.0			2.50		
Little Falls	April 29	.0054	.0125	.40	.0006	.014	2.10	3.80	5.90
Singac	May				.0008	.0175	2.00	4.75	6.75
Singac	May 22				.0010	.028	2.40	6.40	8.40
Singac	Jun				.0025	trace	3.00	5.50	8.50
Little Falls	June 5				.0015	trace	3.40	5.40	8.80
Singac	Jun				.0080	.0075	3.20	4.90	8.10
Little Falls	Jun				.0080	.0075	3.00	5.10	8.10
Singac	Jun 14				.0007	.0100	3.00	5.10	8.10
Little Falls	Jun				.0005	.0090	3.20	5.60	8.80
Singac	Jun 22				.0007	.0150	3.00	6.50	9.50
Little Falls	Jun				.0005	.0110	2.70	7.50	10.20
Singac	Aug				.0001	.0045	3.10	5.00	8.10
Little Falls	Aug				.0008	.0040	4.30	5.50	9.80
Singac	Aug 1				.0015	.0120	4.50	5.90	10.40
Little Falls	Aug 11				.0008	.0080	4.00	6.60	10.60
Singac	Sept				.0001	.0070	3.30	4.20	7.50
Little Falls	Sept 1				.0001	.007	3.30	4.40	7.70
Average		.0042 +			.001	2 +	3.11 +		8.97
Faucet, of Broad St., most	Pass	Wat	Feb	.30	.021	5		2.70	5.00	7.30
Pump at Belleville Pumping Station			Feb	.011 +	.225	.50	.015	2.40	6.70	9.10
Gate of North Basin at Belleville			Feb	.022 +			.0035	2.70	6.0	8.30
Average				.018	.20 +		.0022	2.53 +	6.33 +	

The examinations, as well as the known conditions affecting the river above Little Falls, prove that the water at this point is contaminated To just what degree could only be determined by a considerable number of comparative tests

The average for the Passaic water, taken at Belleville, although worse than that for Little Falls, is not so widely different as might be supposed from the existing conditions on the river; but it should be remembered that the samples from Belleville were taken at a season of the year when there is least complaint about the water, and the other samples during the Summer and Fall.

PASSAIC RIVER WATER AND TYPHOID FEVER.

The knowledge obtained through investigation of Typhoid Fever epidemics in the past has been such that when an epidemic now occurs almost the sole causes looked for are an impure water supply or infected milk.

The Passaic River has contributed its full share of evidence on this subject, as the following table will show:

TYPHOID FEVER DEATH RATE PER 100,000 INHABITANTS

Year	NEWARK. Deaths	Rate	Source of Water Supply	JERSEY CITY. Deaths	Rate	Source of Water Supply	(c) Deaths	Rate	PATERSON Source of Water Supply
1889	153	90.0	Passaic River at Belleville	123	..	Passaic River at Belleville	19	25.2	Passaic River at Paterson Falls
1890	114	62 8	"	148	90 8	"	18	23	"
1891	186	96.4	"	158	94.5	"	18	22.7	"
1892	81	42.1	(a) Pequannock river	90	52.4	"	15	18 2	"
1893	44	22.2	"	105	59 8	"	33	38.	"
1894	34	16.6	"	119	66 1	"	28	30 6	"
1895	50	23 1	"	134	73 6	"	21	21 6	"
1896	47	20 9	"	114	60.9	(b) " and Pequannock River	47	46.3	"
1897	33	14.4	"	41	21.4	(b) See Foot Note	49	46 5	"
1898	41	13 2	"	71	36 3	(b) "	35	32.	"
1899	66	27 5	"	30	15.0	(b) "	34	29.7	"
1900							49	40.8	(d) "

(a) Newark abandoned Passaic River water in April, 1892.

(b) During 1896 Jersey City got about one-third of its supply from the Pequannock River. The Passaic water from Belleville was abandoned in 1897, and from then until the Fall of 1899 the supply was [illegible] at Paterson Falls, when that part of the supply from Paterson Falls was abandoned in favor of Little Falls.

(c) For years ending Feb. 28th

(d) Paterson changed its source of water supply to Little Falls Dec. 7th, 1899

This table, and others similar, shows that the Typhoid Fever rate of a community is a most excellent measure of the quality of its water supply and more practical than Analytical or Bacteriological data, which are often difficult of interpretation.

The rate for Paterson has grown in recent years apace with the defilement of its supply of water It has an intermediate position between the old Passaic rates for Newark and Jersey City, as, also, does the quality of the Passaic River at Paterson Falls occupy a place between the Pequannock and the Passaic at Belleville

TYPHOID FEVER IN NEWARK.

Newark's Typhoid rate dropped about 70% the year the new water supply was introduced and has steadily declined ever since until last year.

In the Fall of 1898 there was an unusual number of Typhoid Fever cases. An investigation of the cause disclosed the fact that a considerable amount of water from the Passaic River at Paterson Falls had for some time found its way into the main pipe line carrying our City supply from the Pequannock. This occurred, according to the statements of the Water Company having control of the system, through the agency of a leaky valve The repair or closing of this valve was followed in due course of time by an abatement of the Fever cases to the normal number.

A far more serious epidemic occurred in the early part of 1899, a more detailed account of which, as well as the previous epidemic, will be found elsewhere in this

report in a reprint of a paper prepared by Dr H C. H Herold, President of the Board.

A protracted spell of extremely cold weather caused such an unusual consumption of water that to avoid a water famine in a portion of the city, the old pumps at Belleville were started ; and from Feb. 13th to Feb 18th, inclusive, 63 million gallons of Passaic water was pumped into the mains supplying all that portion of the City's system known as the low service.

The following month there were three hundred and one cases of Typhoid Fever reported, the next month sixty seven and in May twenty seven, a total of 395 compared with a total of 5 in the corresponding three months of 1898 Most of these cases were in the low service district and in nearly all the rest the patients had been drinking low service water, although living in the high service district.

There were fifty deaths in this period of three months, from Typhoid and only one during the same three months of the year before.

Had it not been for these two epidemics, caused solely by Passaic water, the Typhoid rate for Newark in 1898 and 1899 would have been less than 10 per 100,000, the lowest in its history.

The annexed short table will allow of quick comparisons of the Typhoid statistics for the two years.

NUMBER OF TYPHOID FEVER CASES AND DEATHS IN NEWARK 1898 AND 1899.

		Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1898	Cases..	5	3	2	3	3	7	6	38	59	29	16	8	179
	Deaths	4	2	[illegible]	1		1	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1899	Cases...	2	2	301	67	27	9	19	28	30	12	10	8	515
	Deaths	1		[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]

THE NEW WELLS AT BELLEVILLE.

As before stated, both plans for providing for temporary supplemental water were partially carried out The water from Little Falls was shown to be contaminated The water from the new Belleville wells was found by Chemical and Bacteriological examinations to be of much better quality.

There has been more or less discussion about the effect on boilers of the mineral matter in the water from these wells This part of the subject has not been entered into as it is not likely to injuriously affect the healthful properties of the water However, in a general way it may be said that very little trouble with boilers may be anticipated from this cause, as the lime and magnesia salts are not so very excessive, and when largely diluted, by admixture with the very soft City Water, would have very slight effect on the boilers in the short time it would be necessary to use the water.

In the table following will be found, in addition to the Chemical analyses, some data kindly furnished by the City Engineer and City Bacteriologist.

This will make the table more useful for reference and allow of a more comprehensive judgment of the character of the wells and quality of the water

ANALYSES OF WATER FROM THE BELLEVILLE WELLS AND NUMBER OF BACTERIA PER C. C.
(PARTS PER 100,000)

Well Number	Diam. in Inches (a)	Depth in Feet (a)	Length of Pipe (a)	Depth in Rock (a)	Date	Free Ammonia	Albuminoid Ammonia	Chlorine	Nitrogen as Nitrites	Nitrogen as Nitrates	Hardness Equivalent to Carbonate of Lime	Total Residue on Evaporation	Loss on Ignition of Residue	Fixed Mineral Matter	No. of Well	Bacteria per C. C. (b): April	June	June	June	June	July	July	Dec.
4					July 14	0010	0031	1 00	none	175	7 50	18 60	4 50	14 10	3								
2					" 20	0019	0055	1 10	0016	280	12 60	26 50	5 10	21 40	18								
8	8	151	72	79	" 20	0052	0037	1 20	0004	250	9 80	23 20	7 10	16 10	20				420		34	168	
26	8	306	78 5	227 5											24								3
28	8	200 6	72 75	127 75											25								116
23	8	200	62 5	137 5											27								7
29	8	290	80	210											30								3
27	8	200	77 5	122 5											31								3
30	8	214	79 00	135																			
18					" 20	0007	0024	95	0005	190	8 00	15 20	3 50	11 [illegible]									
34	10	210	61 8	148																			
35	8	316	62	254	(d) " 23	0006	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]		[illegible]									
38	8	202	57 5	14 45	(e) " 23	0014	[illegible]	1 [illegible]	[illegible]	[illegible]	12 [illegible]	[illegible]	[illegible]	[illegible]									
37	8	238	56 3	181 7	(f) " 23	0004	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		17 [illegible]									
32	8	208	58 5	239 5																			
3	8	200	74	126	July 20	0006	0035	1 30	0008	100	9 80	35 30	7 00	28 30									
Old Sand Wells					June 26	0008	0039	80	0006	200	6 80	12 40	3 50	8 90									

(a) Data furnished by M. R. Sherrerd, City Engineer.
(b) Bacterial results by Dr. R. N. Connolly, City Bacteriologist.
(c) [illegible]

(d) Mixed water from Wells N 34, 36, 31, 35, 37, 38 and 32.
(e) " " " " " 19 and 2
(f) [illegible]

The samples taken on July 14th and 20th were during a ten days' test of constant pumping from the wells, and those on Dec 23rd at about the close of a fifteen days' test of continuous pumping.

It will be noticed that the results for the total mixed water on Dec 23rd are quite different from those of any of the three groups of wells or their average. This is accounted for by the fact that only 67 per cent of this water came from the new wells, the rest coming from the old sand wells, which yield softer water, as shown by analysis of June 26th included in table There are seventy-eight of these old wells, altogether in sand and varying from 50 to 55 feet in depth.

The water in the new wells rises to about the same level in all and to within a few feet of the surface.

It can be said that the water from these wells at the end of the final test was of excellent quality, and better than shown by the good results of the previous examination The variations noticed, however, between samples of water from the same wells at different dates indicate that a further study of this water is desirable

WATER FROM WELLS IN THE CITY

This prolific source of disease is being gradually abated Samples of water from 64 wells were examined during the year and but five of them marked passable.

Many wells now in use in the city are of the so called Artesian type They range in depth from 100 to 500 feet, and are usually in rock for the greater part of their depth

The question of the safety of the water from these wells for potable purposes is often a difficult one to

answer The water from nearly all of them shows evidence of considerable previous contamination; but the chemical data and very low bacterial contents in most of them prove that the former impurities have been practically all oxidized and removed At the same time there are often rock fissures leading directly into these wells, and between them and the sources of pollution there may be but a slight filtering medium which is liable to become ineffective at any time.

MEAT PRESERVATIVES.

Besides the work in milk and water reported in these have been a number of other analyses made during the year Perhaps the most important and interesting of these was the examination of two meat preservatives and sausage color

The meat preservatives were white powders which the Meat Inspectors say are used to rub on the meat to preserve it longer in warm weather It is used more particularly in cases where the meat is tainted and interferes with its proper inspection.

One of these powders was found to be pure boracic acid and the other boracic acid, borax and starch

So far as the powders themselves are concerned, they are like most other preservatives While not healthful additions by any means, they serve to mask conditions far more injurious than they are in themselves

MISCELLANEOUS.

Among the various samples examined was a black powder used for dissolving in water to color bologna

sausage. This proved to be nothing but common salt coated with an aniline color.

Other analyses were made of samples of butter, mustard, floor sweepings, sausage, vinegar and ice

RECOMMENDATIONS.

In conclusion I would respectfully call your attention to the great benefit to be derived from filtering the City Water Supply As before stated, practically the only cause for complaint against the quality of the water is its physical appearance This, I believe, could be remedied at a comparatively small cost, and water furnished which would at all times be uniformly clear, without sediment or much color, and with the bacteria so largely reduced that any possible danger from water borne diseases would be practically reduced to nil.

Very respectfully submitted,

HERBERT B. BALDWIN,

Chemist.

[Table No. I.]

BIRTHS RECORDED DURING YEAR 1899

Color		Sex			Nativity of Parents									Name of Child		Legitimacy		
White	Colored.	Male	Female.	Not Stated.	Native	Foreign	Foreign Father only	Foreign Mother only	Nativity of Father only Stated		Nativity of Mother only Stated			Stated.	Not Stated	Legitimate.	Illegitimate	Total
									Native	Foreign.	Native	Foreign	Not Stated					
6607	114	4	3203	49	3037	2558	584	421	17	24	44	14	22	4918	1803	6669	52	6721

STILL BIRTHS REPORTED

				Father.			Mother			Color.			
Male	Female	Not Stated	Native.	Foreign	Not Stated	Native	Foreign.	Not Stated	White	Colored.	Not Stated.	Total
157		27	136	138	17	132	138	11	277	1	3	281

[Table No II.]

MARRIAGES REPORTED

				Nativity																	
White		Colored		Native		Foreign		Not Stated		First Marriage		Second Marriage		Third Marriage		Fourth Marriage		Not Stated			
Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total	
[illegible]	[illegible]	[illegible]	63	1111	926	4	54	[illegible]	34	1073	1091	222	156	17	14		1	28	188	[illegible]	

[Table No. III]

NATIVITY OF DECEDENTS.

United States	3,113
Germany	572
Ireland	436
England	93
Italy	91
Scotland	45
Russia	26
Austria	26
Switzerland	20
Hungary	14
France	12
Poland	8
Canada	6
Sweden	6
Denmark	4
Holland	3
Australia	2
Wales	2
Norway	2
Roumania	2
China	2
Greece	1
Not Stated	51
Total	4,537
Native Born	3,113
Foreign Born	1,373
Not Stated	51

[Table No. IV.]

DEATHS IN INSTITUTIONS AND PUBLIC PLACES

St. Michael's Hospital	253
City Hospital	192
St. Barnabas' Hospital	80
German Hospital	76
Essex County Hospital for Insane	55
Alms House	52
Babies' Hospital	43
Little Sisters of the Poor	24
House of the Good Shepherd	5
Home for Incurables	3
Police Ambulance	3
Home for Aged Women	3
Women's Hospital	2
Eighth Avenue Day Nursery	1
Newark Female Charitable Society	1
Essex County Jail	1
Home for Aged Colored	1
Monastry of St. Dominic	1
Newark Orphan Asylum	1
St. Peter's Orphan Asylum	1
Pennylvania Railroad Station	1
D., L & W R. R. Station	1
Continental Hotel	1
Landermasser Sanitarium	1
Domestic Sewing Machine Company	1
Total	803

[Tables Nos. V and VI.]

WELLS RECORDED

Location of Well	Sup. P. No.	Kind of Depth.		For Manufact'g Purposes	Privy Vaults and Cesspools within 50 Feet	100 Feet	Result of Analysis.
Roseville Ave., 260	518 R	Bucket	60	Domestic			Suspicious
Riverside Ave., 781	519 R	Bucket	50	"			Contaminated
Nassau Street, 34	174 R	Bucket	50	"			Contaminated
Ferguson St., 679 and 681	718	Bucket	15	"			Very badly contaminated
Darcy Street, 67	719	Pump		"			Very badly contaminated.
Market Street, 367	720	Driven	315	"			Passable
Riverside Avenue, 1st house north of Chester Av	721	Bucket	16	"			Passable
Brill Street, 63	722	Bucket	25	"			Very badly contaminated.
Ferry Street, 134	723	Pump	24	"			Contaminated.
Kossuth Street, 68	724	Bucket	25	"			Very badly contaminated
[illegible] Street	725	Bucket	25	"			Suspicious.
[illegible] Av	726	Pump	30	"			Contaminated.
[illegible] Street	727	Bucket	40	"			[illegible]
Jefferson St., 111	728	Bucket	19	"			Very suspicious
Clinton St and Vernon Av.	729	Bucket	27	"			Contaminated
Third Street, 612	730	Bucket	15	"			Very suspicious
Meadow Br'k, No of 5th Ave	731			For Watering Cows			Badly contamintaed.
Summer Avenue, 730	732	Bucket	56	Domestic			Suspicious
Bergen Street, 79	733	Cistern		"			Badly contaminated.
South 14th St., 786	734	Cistern	12	"			Very badly contaminated

Broad Street, 717-721	35	Driven	350	Domestic					Suspicious
Madison Street, 58	736	Bucket	30	"	1 P. V.	....	..		Contaminated.
Jefferson Street, 89	737	Bucket	30	"	....	..	..		Contaminated.
Adams Street, 219 and 221	38	Bucket	32			2 P. V.			Contaminated
South 14th Street, 1311-13	39	Driven	165						Suspicious
Market Street, 147	740	Driven	560	"	..	....	....		Contaminated
Union Street, 112	741	Bucket	18	"	....	1 P. V.	....		Contaminated.
Chester Ave. and R. R. St.	42	Pump	40						Badly contaminated
Market Street, 595	743	Bucket	22	"	1 P. V. 1 C. P.	....	...		Contaminated
Napoleon Street, 18	744	Bucket	20		1 P. V. 1 C. P.				Contaminated
Madison Street, 23 and 25	745	Bucket	30		2 P. V.				Contaminated
Oliver Street, 216	746	Bucket	19	"		..	1 P. V.		Contaminated.
Oliver Street, 220	747	Bucket	10	"	...	2 P. V.	....		Contaminated
Congress Street, 28	748	Driven	228	"	...	.	..		Suspicious.
Ferry Street, 103	749	Pump		"	3 P. V.				Badly contaminated
South Street, 1/8	750	Bucket	14	"	..		1 P. V.		Contaminated
Riverside Avenue, 27	751	Bucket	12	"	.	...	1 P. V.		Very suspicious
Jelliff Avenue, 134	752	Bucket	25	"	1 P. V.	..	...		Contaminated.
Ashland Street, 11	753	Bucket		"	....	1 P. V. 1 C. P.	...		Contaminated
Belleville Ave., 115 and 117	754	Bucket		"		....	2 P. V.		Contaminated
Johnson Street, 22 and 24	755	Bucket	13		2 P. V.				Contaminated
Monroe Street, 68	756	Pump		"	....	1 P. V. 1 C. P.	....		Contaminated.
Pacific Street, 187	757	Pump			2 P. V.				Very badly contaminated
Pacific Street, 160	758	Bucket				2 P. V.			Very badly contaminated
Pacific Street, 164	759	Bucket	30		1 P. V.	2 P. V.			Very badly contaminated
Oliver Street, 152	60	Pump				3 P. V.			Very badly contaminated
First Street, 210	761	Bucket	70	"	....	1 P. V.			Suspicious.
Union Street, 138	762	Pump	40		1 C. P.	1 P. V.			Very badly contaminated
South Street, 219	763	Bucket	9		2 P. V.				Badly contaminated
South Sixth Street, 397	764	Pump	25			1 P. V.			Contaminated
Malvern Street, 106	765	Bucket	7	"	....	....	5 P. V.		Contaminated

Letter "R" indicates where wells were re-analyzed

METEOROLOGICAL REPORT.

METEOROLOGICAL OBSERVATIONS DURING THE YEAR 1899.

The first two months of 1899 formed a part of a record-breaking Winter There was snow galore a year ago, with the accompaniments of sleighing and skating The Winter by the calendar closed on March 22, but there was killing frost as late as April 17, and a snow flurry well along in May.

Vegetation was exceedingly backward The wild flowers that school children usually gather early in April did not appear till May The season was fully two weeks late The first few days of May were hot and forced blossoms, but the dryness of the atmosphere of the tree-growing months was fatal, and very little fruit matured.

The Summer was delightfully cool The longest hot spell came before the sun had entered the domain of the Crab Nothing in the three months following equaled in duration or intensity the heat of the four days in June, beginning with the 5th, when 94 degrees, 98 degrees, 94 degrees and 92 degrees were the records made Few persons care to experience a repetition of such weather as that of the 6th The thermometer showed a temperature of 81 degrees at 7 A M ; 84 degrees at 8 ; 86 degrees at 10 ; 94 at noon ; 98 at 3 30 P M. Fortunately the heat on

none of these days continued late into the night, and besides, brisk winds prevailed throughout the entire warm period.

The coldest day of the year was February 10. It was also the coldest February day ever recorded in this city. It was one of a series of frigid days. On the 9th the mercury marked 2 degrees below zero at 6 A. M., 1 below at 7; 4 above at 2, and 1 below at 9 P. M. On the 10th the temperature at 6 A. M. was 9 below zero; at 7 A. M., 8 below; at 8 A. M., 6 below; at 10 A. M., 2 below; at 2 P. M., 5 above; at 9 P. M., 1 below. On the next day the mercury ranged from 6 below to 12 above. Warm weather did not come till the 15th. The last killing frost of the Spring season was on April 17.

The following table shows the average and extremes of each month. There is also appended a list of averages and extremes that cover a period of more than fifty years. Observations have been made in this city systematically since 1843. It is almost needless to say that the earlier observers were not provided with as delicate instruments for the work as those of later years.

MONTHLY TEMPERATURES FOR 1899.

	AVERAGE.	HIGHEST.	LOWEST.
January	29.8 deg.	55 deg.	2 deg.
February	24.8 deg.	55 deg.	9 below
March	36.3 deg.	58 deg.	16 deg.
April	48.6 deg.	81 deg.	26 deg.
May	61.1 deg.	89 deg.	42 deg.
June	71.4 deg.	98 deg.	50 deg.
July	73.5 deg.	94 deg.	49 deg.
August	71.4 deg.	94 deg.	51 deg.
September	63.4 deg.	86 deg.	42 deg.
October	56.2 deg.	81 deg.	29 deg.
November	42.5 deg.	62 deg.	27 deg.
*December	37.0 deg.	*61 deg.	*15 deg.

Average temperature of this year, 51.3 degrees.
Highest temperature, 98 degrees, on June 6.
Lowest temperature, 9 degrees below zero, on February 10th.

MONTHLY TEMPERATURES, 1843-1898.

	AVERAGE.	HIGHEST.		LOWEST.	
	Deg	Deg	In	Deg.	In
January ...	29 1	65	1876	13 below	1866
February ..	30.5	68	1854	*8 below	1855
March	36.3	77	1851	2 above	1868
April	[illegible]	93	1896	17 above	1857
May	[illegible]	97	1895	31 above	1861
June	[illegible]	*97	1895	38 above	1843
July	74 2	102	1898	46 above	1845
August	[illegible]	99	1854	47 above	1854
September	64 [illegible]	100	1876	34 above	[illegible]
October	53 4	89	1897	22 above	1845
November	42 [illegible]	74	1896	8 above	1875
December	32 [illegible]	68	1848	7 below	1880

Record broken [illegible]

Average annual temperature for Newark, 51.9 degrees.
Highest temperature, 102 degrees, 1898.
Lowest temperature, 13 degrees below zero, 1866

A comparison of these tables shows that 1899 is a trifle below the average in temperature. Seven months fall below their means, February very much so, while December varies as much in the opposite direction

The average annual precipitation for this city is forty-six inches. This includes rain and melted snow. The "wettest" month is August, the dryest, April. Four inches, scant, is a fair monthly average. There are cycles of rainy years, following cycles of dry years The three years preceding this were marked by excessive precipitation This present year is about two inches below the average.

A remarkable feature of this year's rains is the fact that more than nineteen inches of the total of 44.42 inches (or nearly one-half) is the product of twelve storms. Some of these storms were of exceedingly short duration

Such storms are of little value to vegetation, in fact, more often prove disastrous. In our city streets they have a sanitary value, of course, and are often "god-sends" to the street cleaning department. On the other hand, they may at the same time be the dread of another city department, the one that has to keep in repair pave ments and sewers. Nor are they welcome to the purveyors of the city water supply as are storms of a longer duration and a more gentle nature.

Following is a table showing precipitation.

	Rain and Melted Snow Inches	Snow Inches.	Days of Rain.	Greatest Precipitation in 24 Hours Inches
January	[illegible]	7 50	12	2 02
February	[illegible]	26 00	15	1 13
March	[illegible]	4 00	14	1.21
April	[illegible]	Trace	5	1 20
May	[illegible]	0	7	0.76
June	[illegible]	0	7	0.36
July	[illegible]	0	13	1.61
August	.4 92	0	11	2 89
September	6 49	0	11	2.14
October	2 54	0	7	1 04
November	1.78	3.00	8	1.13
December	2 44	0.30	8	1.26
Totals	.44 42	36 80	[illegible]	

Total for 1898 is 53 64 inches
Total for 1897 is 66.52 inches

There were thirty thunder storms in all. Of these three came in March, three in May, six in June, six in July and five in August. Other months had two or fewer. The first came in January.

Frost was noted in the suburbs as early as September 25, but no killing frost arrived until the morning of

October 2. The snow storms of February 11 and 12 were very severe. When the storm began on the evening of the 11th the ground was already covered with a layer six inches deep on a level of hard and firm snow. The weather was the coldest that the city had seen since 1866. Probably no cold spell in this century lasted so long. The city streets had not been cleared. Several trolley lines had not yet been dug out. It was difficult to measure the exact thickness of this huge white mantle, because it was heaped up in great drifts. The wind on the 13th (on which day eight inches fell) raged at a force of over sixty miles an hour. In violence the storm exceeded the famous "Blizzard." Its effects, however, were less disastrous, because it occurred in the depth of Winter and we were prepared for anything that might come in the form of weather. The last snow of that season was on March 7. Sleighing in the city was practically ended by Washington's Birthday.

The first snowfall of the present Winter amounted to three inches. It lasted only a few hours. The date of its coming was November 14. In the preceding year there was an entire week of fine sleighing previous to December 1. There has been no sleighing in this locality thus far this Winter.

Of wind—and it was not a "Presidential year," either there was a copious supply, in fact, a superabundance, with the exception of the one month when all America most craved it—October, when the Shamrock tried her speed with the Columbia. A velocity of sixty miles or more was attained at times during six of the twelve months. In all the remaining months save January and

October there were severe gales, with winds blowing forty miles an hour.

This chart shows the character of the days:

	Cloudless Days.	Part Cloudy Days.	Cloudy Days.	Precipitation Days.
January	13	10	8	12
February	11	6	11	15
March	4	15	12	14
April	13	13	4	5
May	8	13	10	7
June	12	13	5	7
July	11	12	8	13
August	8	14	9	11
September	15	7	8	11
October	7	12	12	7
November	16	5	9	8
December	10	11	10	8
Totals, days	128	131	106	118

Of the holidays, Memorial Day, Independence Day, Labor Day, Dewey Day, Thanksgiving Day and Christmas, all were fine. New Year's Day opened with a snow storm, but cleared before noon. Lincoln's Birthday was very stormy, with heavy snow fall and high winds. Washington's Birthday was cloudy and rather warm. Easter came early, on April 2. The day was partly cloudy, windy, cold and marked with snow flurries.

Of miscellaneous phenomena there are but few worthy of special mention. Of course blustering lunar halos and coronae were numerous as usual. There was a dearth of aurorae. Meteoric displays were most frequent

in November, but clouds shut out in this locality the great display that was scheduled for the night of the 14th and morning of the 15th of that month. The dryness of the air and the nearness of forest fires produced during this same month a peculiar haziness that dulled the sun by day and often entirely obscured the sky at night.

The year goes out as it came in, cold and blustery.

GEO. C. SONN,
Observer.

AREA OF CITY AND EXTENT OF PUBLIC IMPROVEMENTS.

Census Population, 1890	181,830
Estimated " 1899	240,000
Total area of the City's square miles	18½
Built up portion, square miles	12½
Meadow land, " "	6
Length of River and Bay front, miles	10.5
Number of miles of granite block	33.84
" " " trap "	12.29
" " " telford pavement	11.28
" " " cobble stone pavement	13.56
" " " asphalt pavement	29.17
" " " brick pavement	3.76
Total length of paved streets	103.90
Number of miles of unpaved streets	119.82
Length of Electric Railways, miles	70.00
Length of Steam Railways	28.38
Length of brick sewers	60.81
Length of pipe sewers	105.99
Total length of sewers	166.80
Total number of sewer basins	2,572.
Length of water mains, miles	229¼
Average daily consumption of water during the month, gallons	25,000,000
Capacity of water supply per day, gallons	50,000,000
Number of buildings	29,736

PUBLIC PARKS.

Military, acres	6.45
Washington, acres	3.40
Lincoln "	4.37

NEW PARKS.

Branch Brook, acres	280.
East Side, "	13.
West Side, "	23.